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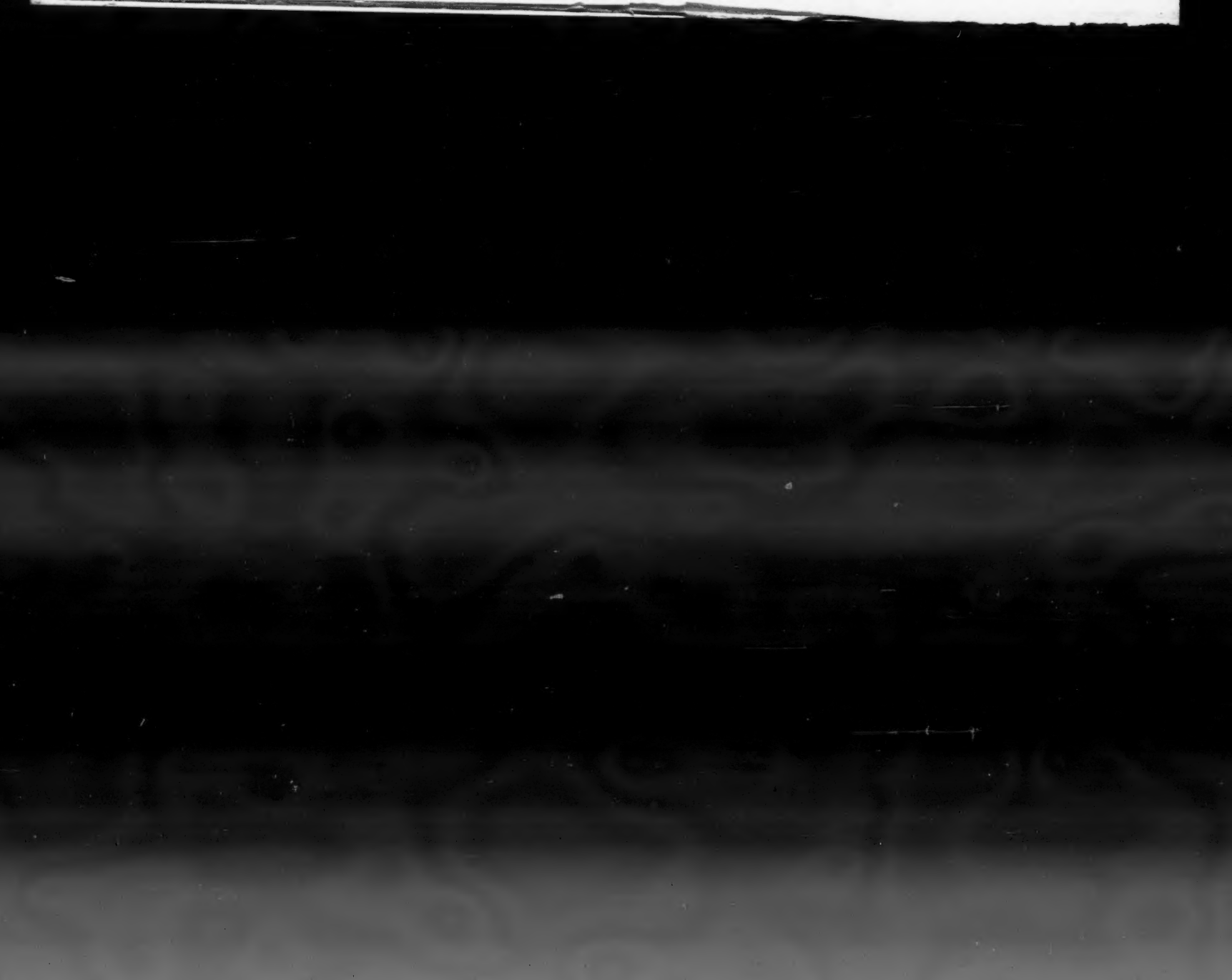

SURGERY, GYNECOLOGY AND OBSTETRICS

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IODINE IN SURGERY, WITH SPECIAL REFERENCE TO ITS USE AS AN ANTISEPTIC[1]

BY NICHOLAS SENN, M.D., CHICAGO

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THE rise and fall in the repute and confidence of therapeutic agents on part of the profession are subjects of the deepest interest to every progressive student of medicine. Few drugs have stood the test of time and a large experience. Only too often the claims made for a remedy in the treatment of a certain disease are not substantiated when subjected to an impartial trial by a scrutinizing profession which has emancipated itself from the yoke of authority, and which, since the dawn of modern progressive scientific medicine and surgery, is earnestly engaged in search of facts based upon experimental research and reliable clinical observations. The *modus operandi* of many of the old and well-established remedies which have gained a well-merited reputation by their empirical employment, has been intelligently explained by the results of accurate scientific investigation and experimental research. In the light of such investigations some of the old remedies have found new applications, and among these iodine has recently attracted the attention of surgeons in a new rôle, namely, as an antiseptic. Iodine was discovered in 1812 by Courtois, a soda manufacturer of Paris. It plays an important part in nature's labratory, as it is found widely diffused in the vegetable, mineral, and animal kingdoms. It exists in certain marine plants, particularly the fuci or seaweeds, and in various vegetables, potatoes, beans, peas, in some of the grains, and in many of the natural mineral waters, and in combination with native sodium nitrate, sodium iodide, and in some kinds of rock salt. In the animal kingdom it is found in the sea-sponge, the oyster, cod liver oil, and eggs. In the animal tissues it is widely distributed. Justus, making use of a micro-chemic method, found iodine in the thyroid, thymus, lymphatic glands, kidney, spleen, testis, and suprarenal body. This substance appears to have a special predilection for the nuclei of cells, as it is found here most constantly and in largest abundance. The importance of iodine in the animal and vegetable tissues is evident; its exact office remains undetermined. Iodine is soluble in 5,000 parts of water, and in 10 parts of alcohol, at a temperature of 59° Fahrenheit; it is freely soluble in water when combined with potassium iodide, the color of the solution varying according to its strength from a light sherry color to a dark brown, almost black, color. Dissolved in chloroform or carbon disulphid, the solution is violet in color. It is a very volatile substance, and evaporates even at common temperatures. The solution of iodine in water has no taste, and only a feeble odor of the drug. Iodine combines with most of the non-metallic and nearly all the metallic ele-

[1] Read before the North Tri-State Medical Society, Fort Wayne, June 15, 1905.

ments, forming a class of compounds called iodides. It was first employed as a medicine by Dr. Coinet, of Geneva, and soon acquired a reputation as an absorbent and counter-irritant in the treatment of many local affections, notably goitre. It has had a very extensive trial in the treatment of pleuritis, pericarditis, peritonitis, and chronic and acute inflammation of joints, bones, and lymphatic glands. It has won a lasting fame in the treatment of syphilis, and is regarded as a specific in the hereditary form of the disease. The iodides have proved invaluable for the tertiary stage of this disease, as they often cause the rapid absorption of nodes, gummata, and other specific deposits. About half a century ago, injections of the tincture of iodine were frequently resorted to in the treatment of hydropic serous cavities, and in the treatment of hydrocele, introduced by Velpeau. It has retained some of its former prestige to the present day. Professor Brainard, of Chicago, was a warm advocate of this treatment, and did not hesitate to extend its use to serous accumulations in the cranial cavity, spinal canal, joints, and pleural and abdominal cavities. The surgeons of that time recognized its stimulating action on serous surfaces, and relied on it in effecting obliteration by a process of plastic inflammation after complete or partial evacuation of the contents of the cavity. Brainard was enthusiastic in his expectations of the use of iodine in the treatment of spina bifida, which he introduced in 1848. The solution used consisted of one-fourth of a grain of iodine, three-fourths of a grain of potassium iodide, and one ounce of distilled water. Up to 1859 he operated on six cases, and collected five others from the practice of other surgeons, and it would seem that in all of them no dangerous effects were produced. Velpeau adopted this treatment in 1856, and Journeé in 1868 collected eighteen cases, of which number fourteen proved successful. English surgeons gave this treatment an extended trial, using for this purpose Morton's solution, which is composed of iodine, 1 part; potassium iodide, 3 parts; glycerin, 48 parts. This treatment was continued with varying results until aseptic surgery decided in favor of more reliable and safer operative intervention by radical operation.

In the treatment of hydrocephalus iodine appears to have been disappointing. Von Ranke reports a case of chronic hydrocephalus in which he injected the ventricle, after tapping with 30 c. cm. of a weak solution of iodin. The case promised well for a time, but proved fatal on the twenty-fourth day, death being caused by an intercurrent attack of intestinal catarrh. A few years ago a young man came into my clinic complaining of obscure cerebral symptoms without any distinct focal evidences, but it was evident that abnormal intracranial pressure was present. I trephined on the right side, over the arm center. The dura was dense, and bulged into the opening. Cerebral pulsations were absent. I tapped the right ventricle with a small trocar, and removed half a teacupful of cerebro-spinal fluid, and then injected an ounce of iodine solution (sherry color). No untoward symptoms followed, and the patient left the hospital after two weeks, materially improved.

In the treatment of so-called scrofula and lupus, iodine internally and locally commanded the confidence of the profession for more than half a century before the bacillus of tuberculosis was discovered. Internally, Lugol's solution (iodine, ℈4; potassium iodide, ℈1; distilled water, ℥8¾) or the syrup of iodide of iron were used, and locally tincture of iodine, Lugol's caustic solution (iodine, potassium iodide, āā, ℈i; water, ℥ii), and the ointments of iodine or potassium iodide. A concentrated solution of iodine in glycerin was used with much success by Dr. Max Richter, in the treatment of ulcerating lupus and non-vascular goitre. The solution was applied with a camel's-hair brush, and evaporation of the iodine prevented by covering the surface with gutta percha, held in place by strips of adhesive plaster. As a local application, Mehu's iodized cotton gained at one time an enviable reputation. It was prepared in the following manner: Finely divided iodine, 5 to 10 parts, sprinkled between layers of loose cotton, 100 parts introduced into a tall glass vessel, and the latter placed horizontally on a water or sand bath. As soon as iodine vapors rise, and air is expelled, the bottle is tightly stoppered.

Continuing moderate heat, the iodine vapors penetrate the cotton and color it yellow. After two hours the cotton will have assumed the color of burnt coffee, and the preparation is finished. As an intra-articular injection in the treatment of joints, iodine has been used for a long time, and with decided benefit. The solution in common use was composed of 1 to 5 per cent iodine, 10 per cent potassium iodide, dissolved in distilled water. The strength of the solution was gradually increased from 1 to 5 per cent. As early as 1878 Orlow treated eight cases of inflammation of the knee joint with serous effusion, and two cases with sero-purulent effusion by tapping and injection of a solution of iodine. He allowed some of the solution to remain in the joint. Reaction was never severe. No further treatment was necessary, and all of the patients recovered. Durante recommends a solution of one to five per cent of iodine injected into and around tubercular joints. He limits the amount of fluid to 15 drops, and repeats the injection daily, using a hypodermic syringe for this purpose. Biagi claims to have cured six cases of tubercular peritonitis by injections of iodine. He makes use of a sixth to a half grain in aqueous solution. The injection is followed by pain, but is devoid of risk. Favorable results by this treatment are also reported by Campanini. In one of his cases forty-nine injections into the muscles of the abdominal wall proved successful.

As an antiphlogistic agent, iodine was first introduced by Mr. Davis, of England, and soon found a wide range of application in the treatment of erysipelas. S. D. Gross, the Nestor of American surgery, speaks of iodine in the treatment of this affection as follows: "Its reputation in erysipelas is fully established, and I have certainly myself found no article at all comparable to it in that affection as an endermic remedy. It is also of great service in boils, carbuncles, whitlow, corns, bunions, and inflamed irritable ulcers of the extremities."

Lobit used iodine as an abortive in twenty-five cases of facial erysipelas, making a ten per cent solution of the drug in collodion and painting this over the inflamed surface. He attributes the curative effect to its bactericidal properties. Smolitsch has treated, with the most satisfactory results, more than one hundred cases of erysipelas, by applying the tincture of iodine to the affected part, and at least two inches beyond the inflamed zone twice in twenty-four hours, and covering the surface with cotton to prevent the too rapid evaporation of the iodin.

The experience of Trichomirow agrees with that of Smolitsch. He applies the tincture three to four times a day, and has seen the next day following its use, a fall in the temperature and limitation of the disease.

Rollin, Sereins, and others have employed parenchymatous injections of the pure tincture of iodine, with marked success in the treatment of anthrax.

Two new preparations of iodine have quite recently engaged the attention of the medical profession, namely, trichloride of iodine and iodopine. The former introduced into practice by Langenbuch has been given quite an extensive trial in the treatment of tuberculosis of the genito-urinary organs. A solution of one-fourth of 1 per cent has been found beneficial as an injection in tubercular cystitis. In proportion of 1:1,200 in culture media, it inhibits the growth of bacteria. Riedel found that a 0.3 per cent solution in water killed spores of bacilli in a very short time. Winternitz introduced iodopine, a solution of iodine in sesame oil, which has been used quite extensively by subcutaneous injection, and internally in the treatment of tertiary syphilitic affections. The dose is 20 c. c. of the 25 per cent solution by subcutaneous injection, and internally three to four teaspoonfuls of a 10 per cent solution. Finally, iodine and its salts have earned a well-merited reputation in the treatment of actinomycosis and blastomycosis by internal administration and local applications. These brief allusions to the therapeutic value of iodine, as determined by clinical experience in the past, suffice to demonstrate that it is a remedy of great value, and one which is certain to maintain its high position in the estimate of the medical profession, supported as it will be by substantial scientific proof. The time has arrived to assign to it its proper place as an antiseptic. Much of the therapeutic value of iodine and its salts depends on the

readiness with which these remedies enter the tissues of the body by internal, rectal, and endermic application, being thus promptly brought in contact with the tissues. The absorption of potassium iodide, when introduced into the rectum, is as rapid as when given by the stomach, especially when the solution is heated from 95° to 98.6° Fahrenheit. Administered by the mouth, iodine can be detected in the saliva in fifteen minutes, and in ten minutes after introduction through the rectum (Lemanski). The speedy and free absorption of iodine and its salts by the skin has been abundantly established by accurate experimentation. Linossier and Lannois found by their experiments, contrary to the general opinion, that the tincture applied to the skin is absorbed more rapidly if the surface is exposed to the air, than under an occlusion dressing. Skin damaged by the local use of iodine does not absorb as readily as intact healthy skin. From experiments made on rabbits by immersion in iodine solution, Gallard has become convinced that the healthy skin absorbs promptly and freely aqueous solutions of iodine. In examining the tissues of the animals experimented on, the iodine was found to accumulate in certain organs, especially the brain and the glands. He likewise proved that seven to twelve times more of the iodine is absorbed if the surface to which it is applied is covered by an impermeable texture than if it remained exposed to the air. In medicinal doses, slight intoxication is manifested by a complexus of symptoms, which has been designated as iodism, the main features of which consist of coryza, soreness of mucous membrane of mouth and throat, and ptyalism. Iodism in persons peculiarly susceptible to the toxic action of iodine, is just as liable to occur in consequence of small as large doses. Iodine is eliminated from the system chiefly by the kidneys, in the state of hydriodic acid or an iodide. Terrile found by his experiments on animals, that after subcutaneous injection, iodine is found in the urine for twenty days, while it is usually absent in the blood after two days. In man he ascertained by using an iodine solution in washing out an empyemic cavity, that no iodine could be detected in the exudate after the first twenty-four hours, while its presence in the urine was manifest for several days. Iodine is also freely eliminated from the system by the skin and the mucous membrane of the respiratory tract. The prolonged use of the drug often gives rise to acne and other eruptions of the skin, and inflammation of the Schneiderian membrane and fauces, conditions undoubtedly due to the local action of the remedy on its way out of the system through the parts affected; as Adamkiewicz has found iodine in the secretion of the sebaceous glands and mucous lining of the nose in cases of iodism. If the elimination of iodine is interfered with by disease of the kidneys, acne is more prone to develop as a consequence of iodine medication.

The therapeutic value of iodine as a local remedy in surgery depends on two distinct properties of the drug: (1) It is a powerful tissue stimulant. (2) It is one of the most potent, least harmful, and most reliable of the known antiseptics. A combination of these two actions renders it an invaluable agent both in aseptic and antiseptic surgery.

IODINE AS A TISSUE STIMULANT

In appropriate solution, iodine is not destructive to the tissues like most of our more common antiseptics now in use. Its direct action on the living tissues is productive of an active tissue proliferation, attended by a corresponding increase of vascularity of the tissues, influenced by its local action. Applied to infected tissues, it causes an active phagocytosis best calculated to aid its antiseptic property in combating the infection. This stimulating action is of special value in the surgical treatment of tubercular and other chronic inflammatory processes. As a tissue stimulant, iodine has been studied experimentally. Heinz made experiments on animals to determine the local action of iodine on the tissues, and found that it consists essentially in a typical adhesive inflammation, with fibrinous deposits on the inflamed surface, besides moderate, diffuse, inflammatory tissue irritation, attended constantly by diapadesis of the red blood corpuscles, but without necrosis and without affecting the integrity of the leucocytes. Schleich in his experiments on animals found that wound cavities packed with a sponge,

saturated with a solution of potassium iodide, the packing contained more leucocytes than by the use of any other antiseptic. This observation induced him to recommend the internal use of this drug as a means of hastening the healing of wound cavities. Iodine has been used for a long time in producing plastic inflammation of serous surfaces for the purpose of obliterating hydropic serous cavities; consequently this substance was used in some of my experiments made in 1888, in studying the effects of mechanical and chemical irritation on the peritoneum. I will cite here only one of the experiments.

"Medium-sized dog. The needle of a hypodermic syringe was thoroughly disinfected, and a dram of tincture of iodine injected into the peritoneal cavity. Immediately after the injection the animal evinced intense pain, which, however, appeared to subside after a short time, and subsequently no unfavorable symptoms were observed. Three days after the injection the urine was examined and reacted to the iodine test. Animal killed nine days after the injection. Circumscribed plastic peritonitis over a space four inches square, corresponding to the point where the puncture was made. At this place the omentum was much thickened, very vascular, and firmly adherent to the parietal peritoneum and the adjoining intestinal loops."

IODINE AS AN ANTISEPTIC

As an antiseptic, iodine has not received the attention it merits. Even in the most recent text-books on materia medica and therapeutics, the irritant action of iodine is put in the foreground, and its antiseptic properties are not sufficiently emphasized. We constantly meet with assertions like these: "Iodine is rarely employed for its antiseptic properties, as chlorine is cheaper. The preparations of iodine are in constant use as irritants, and counter-irritants."

Liebig first showed the antiseptic properties of iodine. Fibrin immersed in iodized water does not undergo putrefaction. The addition of a few drops of iodine to fetid pus causes the odor to disappear. Iodine, like bromin and chlorin, possesses the property to combine chemically readily with albuminous substances, coagulating them, thus becoming a potent antiseptic.

Mr. Thomas Bryant, of Guy's Hospital, has for many years used a weak solution of iodine (sherry color) in the treatment of wounds and suppurating cavities. Von Popoff, in suppurating wounds, makes use of iodine water, of the strength 1:10,000 as an irrigation, and noticed a speedy improvement in their appearance and diminution in suppuration.

Meillère ascertained that a litre of spring water can be sterilized in a few minutes by four drops of tincture of iodine; even less will effect destruction of pathogenic microbes. Meyer found a saturated solution in fifty per cent alcohol more efficient as a bactericide than the pure tincture. The tincture is efficient in the disinfection of suppurating wounds. The tincture can also be used immediately after incision of phlegmonous abscesses and furuncles; also as a local application in the disinfection of suspicious surfaces, and to guard against infection in small accidental wounds. In 1880 Sternberg made experiments with iodine, and found that an aqueous solution with potassium iodide was fatal to the micrococcus pneumoniæ crouposæ in the proportion of 1:1,000, and to the staphylococcus of pus in 1:500; time of exposure, two hours. Iodine water was found by Koch to destroy the vitality of anthrax spores in twenty-four hours, but a two per cent solution in alcohol failed to destroy the spores in forty-eight hours. Davaine, who made the first exact experiments on the germicidal power of different antiseptics, showed that seven milligrams of iodine in a litre of water was sufficient to prevent the growth of anthrax bacilli when he added one cubic centimeter of anthracic blood to the iodine solution. The same author also makes the statement that a solution of iodine, 1:10,000, neutralized completely a diluted weak solution of the virus of septicemia.

Cornil and Babes assign to iodine the seventh place as a bactericide. The antiseptic value of iodine is given by Miguel as 1:4,000. In the experiments of Schill and Fischer, twenty-four hours' contact with a solution of the strength of 1:500 failed to destroy the virulence of tubercular sputum, as tested by inoculation experiments. According to Warikoff, iodine

in a solution of 1:5,600 kills the anthrax bacillus, while Koch asserts that a solution of 1:300 is necessary for this purpose. Baumgarten gives the time of the killing power of a two per cent aqueous solution on spores of bacilli as two hours. A one per cent solution of the trichloride of iodine destroys anthrax spores suspended in water almost instantly, and a 0.2 per cent solution within a few minutes. Langenbuch found that a solution of 1:1,000 kills spores in a short time, and that when added to nutrient gelatin in the proportion of 1:1,200 it inhibits the growth of bacteria to perfection. Behring, Tavel, and Riedel have proved its valuable inhibitory effect on different pathogenic micro-organisms. It is used in the strength of 0.1 to 0.15 per cent for the disinfection of infected wounds. The above bacteriologic investigations go to prove that all authorities recognize the value of iodine as an antiseptic, but opinions differ widely in regard to the strength of the solution it is necessary to employ, to inhibit the growth of or destroy the different pathogenic bacteria and their spores. More definite light is needed to give iodine the prominence it deserves in the list of antiseptics. Anxious to ascertain the killing strength of iodine solutions on the most important pathologic microörganisms which interest the surgeon, and the time necessary to destroy them, I suggested to Dr. Guy Kinnaman, a recent graduate of Rush Medical College, to make the necessary experiments and investigations in the laboratory for surgical pathology of the college. He commenced his work at once in earnest, and spent nearly a year in completing it. His methods were accurate and his results reliable. The details of his work will soon appear in the medical press in the form of a report of the greatest practical value bearing on the bactericide action of iodine. He has kindly furnished me with the following table, showing:

STRENGTH OF AQUEOUS SOLUTIONS OF IODINE AND TIME NECESSARY TO DESTROY

1. Actinomycosis (Bovis):
   (a) 1:500 for 15 minutes.
   (b) 1:300 for 10 minutes.
   (c) 1:200 for 1 minute.
2. Blastomycosis: 1:500 for 4 minutes.
3. Staphylococcus pyogenes aureus: 1:200 for 5 minutes.
4. Streptococcus pyogenes:
   (a) 1:1,000 for 30 minutes.
   (b) 1:500 for 2 minutes.
5. Bacillus of anthrax and spores: 1:100 for 10 minutes.
6. Bacillus of tuberculosis:
   (a) 1:200 for 60 minutes.
   (b) 1:100 for 7 minutes.
7. Bacillus prodigiosus: 1:100 for 10 minutes.

These experiments and their results so carefully made and so faithfully recorded, leave no further doubt that iodine is an invaluable antiseptic for general use in aseptic surgery, and possesses special virtues in the surgical treatment of affections caused by the bacteria subjected to experimentation. It will be noticed in glancing over the table that the most common and the most dangerous microbe with which the surgeon has to contend — the streptococcus pyogenes — is killed in two minutes when exposed to a solution of iodine of only one-fifth of one per cent. It is only reasonable to suppose that when brought in contact with a one per cent solution it is destroyed almost instantly. The staphylococcus pyogenes is more resistant to the action of iodine, but a one-half of one per cent kills it in five minutes. It seems, then, that even a comparatively weak solution of iodine is the most deadly antiseptic for the ordinary pus-producing microbes. Taking into consideration at the same time that iodine, in solutions strong enough to act as the most reliable antiseptic, does not injure the tissues; on the contrary, it produces a salutary stimulating effect, and that the dangers from intoxication are much less than from the use of the two antiseptics now in most general use — carbolic acid and bichloride of mercury — its superiority as an antiseptic would appear to be established. There is every reason to believe that it will be given the preference over them as soon as the profession will give it the extended trial it deserves. I desire to call attention to the use of iodine as an antiseptic in the operating room, and as a remedial agent in the treatment of affections in which its use in my practice has yielded eminently satisfactory results.

AS AN AID IN HAND DISINFECTION

Roux, of Lausanne, first made use of tincture of iodine as an aid in completing hand disinfection. After disinfecting the hands in the customary way, he dips the finger-tips into the tincture for the purpose of reaching and destroying the microbes lodged in the subungual spaces and folds of the finger-nails. Mikulicz adopted this practice in 1898, and has continued it ever since. After iodizing the finger-nails, he washes his hands once more in lysol solution before he puts on the cotton gloves. Culture experiments made in his clinic, showed that disinfection of the hands with bichloride and lysol solution yielded forty-seven negative results; alcohol disinfection, fifty-nine to seventy-eight per cent, and the additional dipping of finger-tips in tincture of iodine, eighty per cent, demonstrating conclusively the value of iodine thus employed as an aid in hand disinfection. In all aseptic operations in which I do not wear rubber gloves, I brush the subungual spaces and nail folds with tincture of iodine as the last step in the process of hand disinfection. By resorting to this additional aid of procuring asepsis for the hands, I have limited the wearing of gloves to abdominal operations, hernia, and operations on non-suppurating, non-tubercular affections of the joints. I am satisfied of the great value of finger-tip disinfection with tincture of iodine when gloves are not used, and I believe the time is near when a one per cent aqueous iodine solution will take the place of the antiseptics which are now generally relied upon in hand disinfection.

STERILIZATION OF CATGUT

My interest in iodine as an antiseptic was awakened on reading the paper of M. Claudius on iodine catgut sterilization, published in the *Deutsche Zeitschrift für Chirurgie* more than two years ago. I adopted his method at once, and later published my observations on the use of iodized catgut in the *Journal of the American Medical Association*, March 28, 1903. Claudius gives the following directions for iodization of catgut: The commercial raw catgut, without any preliminary preparation, is wound on a glass roll, two strings tied together to each roll. The sterilization is effected by immersion in a one per cent solution of iodine. The solution is made by dissolving one part of iodine and one part of potassium iodide in one hundred parts of water. The iodine and potassium iodide are dissolved in a small quantity of water, to which the iodine, finely pulverized, is added, and the concentrated solution is then diluted to one per cent. The solution and catgut are kept in a bottle with a wide mouth, which is closed with an accurately fitting glass stopper. The date is written on the label of the bottle. After eight days the catgut is ready for use, and is preserved in the same bottle and the same solution. Before use the catgut is immersed on the glass roll in a three per cent solution of carbolic acid, or an indifferent sterile fluid, for the purpose of removing the iodine from the surface of the threads. The threads are cut in the solution as they are needed. The catgut not used in the operation is returned into the bottle, thus doing away with unnecessary waste of material. The catgut thus prepared is pitch black, soft, pliable, and almost as strong as silk. The knots are firm, and not liable to slip or unloosen. Catgut prepared by this method, according to its size, resists absorption for from twelve to sixteen days. Iodized catgut is not only absolutely sterile, but at the same time antiseptic. Claudius ascertained by experiment that if it is embedded in a solid nutrient medium, infected with pyogenic microbes, the iodine contained in the catgut inhibited the growth of germs some distance from the threads. I have made use of iodized catgut exclusive to any other in the surgical clinic at Rush Medical College, Presbyterian Hospital, and St. Joseph's Hospital for more than two years with entire satisfaction. During this time hundreds of culture experiments have been made, and not in a single instance with a positive result. The catgut remains in the aqueous iodine solution without loss of tensile strength for several weeks. If it is desirable to preserve it for a longer time, it is advisable to transfer it after eight days' immersion in the aqueous to an alcoholic solution of similar strength. Many complaints have reached me from different sources to the effect that the catgut thus prepared becomes fragile. This is not the fault of the method, but of the ma-

terial used. Experience has satisfied me that the German raw catgut is the best material for iodinization. A long and extensive trial with iodized catgut has convinced me of its reliability both in regard to its asepticity and tensile strength. Stitch abscesses are extremely rare in the use of iodized catgut ligatures and sutures, and when they do occur they are caused by contamination of the material after it is taken from the solution.

ERYSIPELAS AND SUPERFICIAL LYMPHANGITIS

Knowing the power of iodine as an antiseptic, and the rapidity with which it is absorbed by the skin, we now can fully comprehend its curative effect in the treatment of erysipelas and superficial lymphangitis. In both of these infective processes the structures involved are so near the surface of the skin, that the iodine applied locally reaches the inflamed lymphatic channels in a short time, and by its direct toxic action on the streptococcus removes the microbic cause of the disease. I have seen the most virulent forms of streptococcus lymphangitis speedily arrested under the application of a compress, saturated with an aqueous solution of iodine in the strength of one-half of one to one per cent. This treatment is made more effective by preventing the evaporation of iodine by applying over the compress an impermeable cover of gutta percha, waxed or paraffin paper, oiled silk, rubber or mackintosh. In persons with a very delicate skin, and in children, the strength of the solution should not exceed one-fourth of one per cent.

SUPPURATIVE SYNOVITIS

In several cases of suppurative synovitis of the knee joint I have witnessed the most striking power of iodine as an antiseptic. After multiple incisions and tubular drainage, the joint was irrigated freely with a one per cent solution of iodine, with the result of at once arresting suppuration, a result that I never obtained with any other antiseptic.

LARGE PHLEGMONOUS ABSCESSES

Nearly the same satisfactory results were observed in the treatment of a number of diffuse phlegmonous abscesses. Incision, drainage, and free irrigation with a one per cent solution of iodine invariably resulted in arresting further extension of the disease, and prompt diminution in the amount of suppuration. In place of using a dry dressing, I have generally applied over the affected part a compress saturated with the same solution, retaining the iodine vapor by applying over it an impermeable cover. The compress is changed daily, and the irrigation repeated the same time until suppuration is completely under control.

TUBERCULOSIS OF JOINTS

Ever since von Mosetig-Moorhof called attention to the therapeutic value of iodoform, and von Bruns advocated it so strongly in the treatment of tubercular joints, I have made use of it as an intra-articular injection in synovial tuberculosis with hydrops, and in the treatment of tubercular abscesses with signal success. I had come to regard it as almost a specific in tubercular hydrops of joints, and have seen repeatedly spondylitic tubercular abscess yield to from two to five tappings, followed by iodoformization of the abscess cavity. I have always attributed the curative action of iodoform in these cases to the iodine liberated slowly from the iodoform. In rebellious cases to this treatment, I have found remnants of iodoform in the joints and abscess cavities days and weeks after injection by subsequent tappings. For some time I have abolished the use of iodoform in such cases, and have substituted for it a one per cent aqueous solution of iodine and potassium iodide, and if anything the results have improved after making this change. By using the iodine solution the full strength of the iodine is brought at once to bear on the tubercular tissue lining the joints and abscess cavities, and thereby we secure the direct and full bactericide action of the iodine on the microbic cause of the disease. And it must not be forgotten that iodine is a much more powerful tissue stimulant than iodoform, and consequently has a more pronounced effect in initiating an active process of phagocytosis, a most valuable adjuvant to its antibacillary action. I have been in the habit of washing out the tubercular joints and abscesses freely, with a one per cent iodine solution after tapping and evacuation, and allowing from two to three drams of the solution to remain.

ENDERMIC USE OF IODINE COMBINED WITH CATAPHORESIS

That the absorption of medicines applied to the skin in the form of solutions or ointments is increased by the imployment of cataphoresis is no longer a matter of doubt. In an experimental study of the galvanolytic-cataphoric influences on the eye, Schoeler and Albrand, of Wiesbaden, found that cataphoresis of potassium iodide through the eyeball produces changes in the interior of the eye which are different from those observed in galvano-puncture, and are to be distinguished from those developed by simple galvanic current, as well by the value of the caustic action as by their greater intensity. Hunter McGuire made use of iodine solution applied by cataphoresis in the treatment of goitre. In a long-standing case he applied ten to fifteen drops on cotton in a cup-shaped electrode daily for three weeks. After three weeks' intermission the same treatment was continued for another three weeks, when the swelling was reduced one-half in size, and all subjective symptoms had disappeared. In a recent case of goitre this treatment resulted in complete disappearance of the swelling. Out of a number of cases in my practice, I will here refer only to three which illustrate in a striking manner the value of cataphoresis in the local use of iodine.

CASE 1. *Retro-sternal Goitre; Symptoms of Suffocation; Speedy Diminution in Size of Swelling, and Complete Relief from Subjective Symptoms.*

The patient was a German woman, sixty-three years of age, under my care at the St. Joseph's Hospital. For a number of weeks she had experienced great difficulty in breathing, with gradual loss of voice, so that at times she could not speak above a whisper. She could not lie down, and frequently had attacks of threatening suffocation. On examination it was found that she was free from disease, with the exception of a goitrous swelling about the size of a hen's egg behind the manubrium of the sternum. The swelling followed the movements of the trachea during the act of swallowing, and it was only during the ascent of the trachea that its size could be determined by palpation. Temperature and pulse normal; breathing was difficult at all times; lips cyanotic, with frequent spells of impending suffocation. The swelling was soft, and apparently quite vascular. It was deemed advisable to give the patient the benefit of tentative conservative treatment, which consisted of the local use of ice and a two per cent solution of potassium iodid applied daily by cataphoresis, with a ten milliampere current, continued for ten minutes. After a week of this treatment the ice was discontinued, and the potassium iodide solution increased in strength to ten per cent. The first change in the patient that was noticed was a gradually increasing relief in breathing, cessation of the paroxysmal attacks of dyspnea, and gradual diminution in the size of the goitre. At the end of five weeks the swelling had entirely disappeared, and breathing was normal.

CASE 2. *Extensive Actinomycosis of Submaxillary and Parotid Regions and Pharynx on Corresponding Side. Internal and Local Use of Iodine Powerless in Arresting Further Extension of the Disease; Prompt Improvement, and Ultimately Complete Recovery under Local Employment of Potassium Iodide by Cataphoresis.*

The patient was an Italian, thirty-five years old, who entered my service in the Presbyterian Hospital, January 31, 1899. He was an umbrella-mender by trade, and lived in the Italian quarter of the Ghetto. The disease had existed for several months, and involved the left side of the neck. The submaxillary and parotid regions were the seat of a hard swelling, continuous with the pharynx of the same side, the induration extending down to the clavicle, with a number of fistulous openings on the external surface, which gave issue to a profuse sero-purulent discharge in which minute gray granules could be detected with the naked eye. Microscopic examination of these bodies revealed the characteristic fungus of actinomycosis. The disease was so extensive, and involved so many important structures that a radical operation was entirely out of question. For several months he was given gradually increasing doses of potassium iodide until iodism and a copious acne eruption showed that he was thoroughly under the

influence of the drug, but without any apparent effect on the progress of the disease. We then commenced to administer a ten per cent solution of potassium iodide by cataphoresis in daily seances of from ten to fifteen minutes. Within a very few days a decided improvement was noticed, which continued under the same treatment without interruption until the patient left the hospital nearly a year after his admission in perfect health, the swelling having entirely disappeared and all fistulous tracts healed. He remained in good health for a year, when he was attacked with acute pulmonary tuberculosis, which proved fatal in a few months. He probably contracted the pulmonary disease from his wife, who died of tuberculosis shortly before he was taken ill with actinomycosis.

CASE 3. *Blastomycosis of Skin Uninfluenced by Internal Use of Potassium Iodide; Slow but Steady Improvement and Finally Complete Recovery under Iodine Cataphoresis Treatment.*

The patient was a Hungarian, thirty-five years of age, and butcher by occupation. He was admitted to my service at the Presbyterian Hospital, October 5, 1903. His family history is good, and he is the father of six healthy children. General health little, if any, impaired. In December, 1902, a small red papule made its appearance over the inner middle aspect of the left thigh, which gradually increased in size in the form of a papillomatous ulcerating surface, four by six inches. On admission the skin affection was about the size of the palm of the hand, somewhat ovoid in outline. The border of the ulcerated surface is well defined and indurated; the ulcerated surface itself dotted with shallow papillomatous projections interpersed between small ulcers and minute abscesses. These pinhead abscesses, when opened, exude a white, creamy, viscid fluid. Under the microscope the characteristic fungi of blastomycetes are found in this fluid. A section taken from the border of the lesion shows the rete of the skin hyperplastic, dipping down and forming projections between the minute abscesses. The miliary abscesses are surrounded by a layer of squamous epithelium. The abscess contents consisted largely of blastomycetes, leucocytes, nuclear fragments, red blood corpuscles, and one or more giant cells. The treatment at first consisted of the internal administration of potassium iodide four times a day, the dose gradually being increased to fifty grains and the local use of antiseptics. As the skin affection did not show any signs of improvement, vigorous curettage and cauterization with pure carbolic acid, followed by alcohol, were resorted to without any apparent benefit. The internal use of the potassium iodide was then suspended, and the ulcerated surface covered with a compress, saturated with a one per cent solution of iodine and potassium iodide, aided by cataphoresis, in daily sittings of from ten to fifteen minutes. This treatment was interrupted several times by the patient leaving the hospital for a few days, but in the course of two months resulted in complete and permanent healing of the blastomycetic ulcer.

CONCLUSIONS

1. Iodine is the safest and most potent of all known antiseptics.

2. Iodine in proper dilution to serve its purposes as an antiseptic does not damage the tissues; on the contrary, it acts the part of a useful tissue stimulant, producing an active phagocytosis, a process so desirable in the treatment of acute and chronic inflammatory affections.

3. In the treatment of simple hyperplastic goitre, actinomycosis, and blastomycosis, the local use of iodine is made more effective by cataphoresis.

A NEW PLAN OF PROCEDURE IN RETRO-UTERINE DISPLACEMENTS

By E. E. MONTGOMERY, M.D., PHILADELPHIA
Professor of Gynecology in Jefferson Medical College: Gynecologist to Jefferson Medical and St. Joseph's Hospitals

THE mere existence of a uterine displacement must not be considered an indication for treatment, for uncomplicated displacements do not cause symptoms. The backward displacements from anatomical and hygienic reasons are more prone to the development of complications which will produce symptoms of such a character as to lead the sufferer to apply for relief. I do not wish to be understood, however, as asserting that operative interference is absolutely demanded in all such cases, for the valuable experience of the pioneers in gynecology has demonstrated the efficacy of mechanical procedures for the restoration of comfort and health to many such sufferers. It is sometimes a serious question whether in the assiduous enthusiastic employment of surgical means we do not overlook the more enduring benefit to be derived from less grave mechanical measures. In recent cases of sub-involution where the displacement arises merely from increased weight and requires only to be supported in its normal position until the process of involution can be completed, when the ligaments will be capable of maintaining it, the mechanical measures should be employed. There will still remain a large class of cases, in which the pelvic structures have undergone such changes as to have no influence in keeping the uterus in proper position. The displaced organ is subjected to further insult by intra-abdominal pressure, by neglect of proper evacuation of the bowels and bladder, by unsuitable and improperly adjusted clothing, and violent exercise, which must aggravate the displacement, increase the pelvic engorgement and enhance the danger of complications. Rarely do we find such a displacement exist for a long period which does not become complicated by displaced or prolapsed ovaries, or congestion and inflammation of the uterine mucosa, conditions which render painful the performance of its functions and invite the development of infection.

Retro-displacement of the uterus is distinctive from other displacements in that its existence is a menace to the health of the individual which makes its correction important.

The aim of every operative procedure should be to imitate natural conditions and as nearly as possible utilize natural forces in the maintenance of corrected positions. This axiom naturally produced the Alexander operation and its various modifications. The shortening of the round ligament at its introduction was regarded with especial favor, because it was unnecessary to open the peritoneal cavity to effect its accomplishment; but it was quickly demonstrated that it must be limited to the cases in which the uterus and its appendages were free from inflammatory adhesions, nor was it always easy for the operator to determine the amount of shortening necessary to accomplish the purpose. Even the operator of large experience frequently finds adhesions affecting the pelvic organs when a previously careful examination failed to reveal them and has found none when he was sure they existed. The Alexander operation, then, must be more or less a blind procedure, limited in its application to the cases in which relief is least demanded.

The limitations of this procedure and the recognition of the possibility of surgical correction for retro-displacements naturally led to opening of the abdomen, when Olshausen and Kelly devised the operations of ventrofixation and suspension. While this procedure has been very extensively practiced by surgeons, at home and abroad, has been of the greatest comfort to many afflicted individuals, and one which I have frequently practiced, it still is, in my judgment, a departure from the axiom enunciated to "imitate Nature's methods and utilize Nature's forces." Ventrofixation is a cause of discomfort in a subsequent gestation and may imperil the life of mother and offspring during parturition.

The operator with the most carefully planned

suspension has no assurance that some unforeseen complication will not result in a fixation. The ligament where fortunately secured is under all circumstances inelastic and cicatricial. It may be so firm as to hang the uterus from the anterior abdominal wall, or so attenuated as to result in separation and be of but slight value. In not a few cases, the procedure has been attended with disaster during the convalescence from strangulation of loops of intestine, and can anyone feel certain that the existence of such abnormal adhesions is free from menace in after years? The not infrequent complication of subsequent pregnancy, the frequent failure of the operator to secure just such a suspension as he desired, the not unusual recurrence of the displacement and the recognition of the wide variance from normal anatomical conditions in its best results naturally led to experiments upon other lines. Some of these experiments have been made through the vagina, but, with the exception of the operations upon the utero-sacral ligament, are as wide a departure from the normal as the operative procedure last under consideration. Not unnaturally, the majority of these procedures caused greater complications during subsequent pregnancy than did ventro-suspension, and failed to afford as satisfactory exposure for the treatment of inflammatory alterations of the uterus and its appendages.

Following the thread of experiment, it is not surprising to find that various intra-abdominal operations upon the round ligaments have been devised, as folding them upon themselves, carrying a loop through an opening in the anterior wall, or fastening to the anterior wall, carrying either the loop or end of the ligament through the broad ligament and securing it to the posterior surface of the uterus. All of these methods were in harmony with our governing axiom, but had the disadvantage to be confined to the strongest part of the ligament, while the weakest portion, that which makes its exit through the inguinal canal, remained unaffected to permit the reproduction of the condition. Gilliam carried a loop of each round ligament through the abdominal wall and fastened it upon the aponeurosis. This procedure left two bands in the lower abdominal cavity instead of one, as in ventro-suspension—two places through which loops of intestines may pass and become imprisoned. Ferguson effectually and advantageously modified the operation and diminished danger by gathering the peritoneum externally to the perforation of the wall by a purse-string suture. Simpson similarly picked up the round ligament but carried it through an opening in the broad ligament and out upon the parietal peritoneum, where it was fastened to the muscular structure of the abdominal wall.

The procedure to which I invite your consideration, which I have practiced for the last two years, is a combination of these procedures. It is performed as follows:

1. Through an abdominal incision a temporary ligature is passed beneath each round ligament about one and one-half inches from the uterine cornu, and secured by a hemostat. 2. The two ends of one of these ligatures are threaded into the eye of a pedicle needle, the round ligament seized with pressure forceps just external to the ligature and drawn toward the median line to render the external portion of the ligament tense. The peritoneum of the anterior portion of the broad ligament is picked up and snipped with scissors, affording a trap door through which the pedicle needle carrying the ligature is introduced. The ligature is thus carried between the layers of the broad ligament until the abdominal wall is reached, when it is thrust through the muscular structure and is withdrawn from the needle external to the aponeurosis. A similar course follows with the second ligature. 3. Having drawn the superficial fascia away from the point made by the opening in the aponeurosis, the ligature is rendered tense while pointed scissors are introduced closed alongside the ligature and their blades slightly separated as they are withdrawn. Their withdrawal is generally followed by a loop of the round ligament which is drawn up by the temporary ligature. Should the loop of ligament not readily pass through, it can be teased through by pushing back the tissues with the point of the scissors while traction is made by the ligature. Loops of both round ligaments having been thus brought out upon the aponeurosis, they are, 4, secured by catgut

sutures to the aponeurotic layer. Careful examination is previously made to ensure the proper position of the uterus. 5. The wound is closed. A crescent-shaped incision through the skin fascia and aponeurosis above the pubes, and a vertical incision of the peritoneum as suggested by Stimson, affords increased facility in reaching the ligaments and treating diseased conditions within the pelvis, but is prone to the formation of hematoma between the walls, which may become infected and mar the satisfactory convalescence.

The advantages which, it seems to me, may be claimed for this operation are: 1. It closely imitates the normal condition and employs natural ligaments for its support, which are capable of undergoing evolution and involution during gestation and the puerperium. 2. It employs the strongest part of the round ligament and leaves no lesions within the abdomen for the formation of unfortunate adhesions; and, 3, it permits of the careful exploration of the contents of the pelvis and affords opportunity for the proper treatment of diseased conditions of the uterine appendages and the vermiform appendix.

ON SHORT INCISIONS IN CERTAIN COMMON OPERATIONS[1]

BY WELLER VAN HOOK, A.B., M.D.

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A LARGE part of the work of the surgeon in civil practice consists in the treatment of certain diseases that are of common occurrence, and that by their location and morbid anatomy lend themselves to a management more or less routine in character. The application of routine methods to conditions subject to pathological variations must be controlled by the surgeon with the most critical care. The accurate study of morbid anatomy during the preceding century led surgeons almost to disregard all consequences save the study of the morbid anatomy of each case and its mechanical correction so far as practicable. Aseptic surgery made this kind of practice readily feasible. But within the strict limits of cases that offer but slight morbid anatomical variations, the practice of typical operations, or procedures almost typical, offers the very great advantage that the operator may, by constant practice of the same set of manipulations, attain a technical facility which could not otherwise be reached.

In the case of a number of such diseases it is possible to reduce the length of the incision required for operation to a very considerable degree. None will deny that if the work beneath the skin be properly performed, a short incision is better than a longer one. The advantages of the short incision are that cutaneous deformity is slight, that hernias, where possible, are less likely to occur, and that early convalescence ensues.

It must not be forgotten, however, that only uncomplicated cases are to be treated by short incisions, for where deep-lying anatomical conditions are unknown, open inspection is usually required; that undue manipulation of superficial tissues may lead to increase of liability to infection, as in hernias. The longer incisions, therefore, are needed where complicated manipulations of subcutaneous tissues are required; as, for example, in goitre; where conditions new to the operator are to be encountered, or where tissues to be carefully manipulated cannot be brought to the surface of the wound.

The writer believes that a number of common surgical conditions can be treated, in many instances, through short incisions, but would most strongly insist that where the operator has any doubt whatever about the propriety of a short incision in his hands, a longer one should be utilized. Mere elegance of technique can never be allowed to take the place of a conscientious study of morbid anatomy or of technical exactness.

The cosmetic result of an operation depends,

[1] Read before the Austin Flint-Cedar Valley Medical Society, New Hampton, Iowa, November 14, 1903.

moreover, not only upon the length of the incision, but upon its site, its course, the accuracy of its closure, and the smoothness of its healing.

It is not intended to go into details in regard to short incisions as applied to all possible opportunities for such manipulation. The following discussion will suffice to indicate the principles upon which such efforts are based.

In the neck the most important example is the extirpation of those *tuberculous lymphatic glands*, which are either very freely movable or lie in a comparatively small compact mass. In either case the line of incision must follow the natural folds of the neck. The advantages of such lines, which were suggested by Langer, have been especially pointed out and insisted upon by Kocher. The very fact that such lines exist proves that the natural folds of the neck will conceal the scar which will subsequently form. The site of the incision need not necessarily be over the apex of the gland mass. In most instances an incision made along the deeper folds of the neck can easily be shifted, either by retraction or by altering the position of the head so as to bring into easy accessibility masses located at a considerable distance.

The actual removal of the glands, the exæresis, as our fathers would have called it, may be effected by the usual methods of open dissection or by enucleation with the finger, in case the glands are quite movable. The inexperienced operator must recognize the fact that structures buried in the neck seem, as a rule, far more movable than they actually prove to be when the skin is opened.

The length of the incision has, in many of the writer's cases, not exceeded one inch. In many instances it has been possible to remove lymphatic glands from the posterior triangle through such an incision located in front of the sterno-mastoid muscle and vice versa. The avoidance of excessive scar formation depends, in addition, upon the proper closure of the wound. The platysma, which will have retracted until the edges of the skin have turned in, must be drawn out until the wound edges are everted, and must be carefully united with fine catgut sutures. If an opening is left for drainage, the site for the opening must be chosen with care, and the opening made as small as possible, since a break in the continuity of the platysma will, of necessity, cause the skin to become adherent to the deep tissues, producing an unsightly depression. The accompanying illustrations will, I think, convincingly illustrate the principles and results of my operations.

It was in 1894 that Professor Dollinger[1] published his account of what he calls the subcutaneous method of extirpating tuberculous lymphomata of the neck. At the last meeting of the German Surgical Congress, in 1903, Professor Dollinger reiterated his confidence in the method he had proposed, described some improvements in his technique, and reported the results obtained in one hundred cases.

His incision passes along the border of the hairy scalp. Standing behind his patient, the wound is illuminated by an electric light, and the lymphatic glands are extirpated by an undermining process. I have never used Dollinger's incision, preferring the one already described, but I have been encouraged by his experiences and recommendation to attempt the removal of palpable glands by digital enucleation, providing the glands seem to be freely movable. The method I describe for the extirpation of movable lymphatic glands may always be undertaken by the experienced surgeon in suitable cases with the feeling that, should difficulties insuperable by the technique described arise, resort may be had to the older and more disfiguring methods at a moment's notice.

The suggestion of subcutaneous enucleation, when first made, met with strong opposition, but at the recent meeting referred to, Professor Koenig, of Berlin, admitted that the operation was a proper one when practiced under the indications laid down by its advocates.

Dollinger himself says that his operation demands great care and much skill on the part of the operator, and hence he believes will never attain popularity.

In concluding my remarks in regard to the operation I perform, I would reiterate, with the greatest possible emphasis, my assertion that it must be limited very closely to those cases, on the one hand, in which glands are freely movable, or, on the other hand, to those cases in which the diseased glands, though no longer

[1] Cent. f. Chir., 1894, p. 845.

movable, are confined to comparatively small areas. The results the writer has obtained in a large number of cases operated upon during the last six years where these limitations were observed, have been satisfactory, both as to absence of recurrence and comparative freedom from disfigurement. In males, the incision may be made, as a rule, above the line of the beard growth, or below the level of the collar; in female patients, the incision can usually be made either low enough to be hidden by a collar or by a band of ribbon, or other feminine adornment.

The prevention of recurrence, the writer is firmly convinced, depends not only upon the removal of tuberculous material from the neck, but perhaps even more upon the removal of atria of infection about the face, nose, pharynx, or mouth. And it is highly important, in case hygienic relations have been neglected, that the patient be placed under the best possible conditions to enable him to resist the spread of tuberculosis.

FIGURE 1.—Incision used in a primary operation for empyema. The incision lies about one and one-half inches below and a little outside the angle of the scapula.

FIGURE 2.—Incision employed for operation on gall-bladder, showing its relation to size and position of umbilicus and nipples. Rubber drainage tube still in position.

Very short incisions may easily be employed in many cases of *suppurative pleuritis*. The prevailing notion that gravity is the chief force in the emptying and closure of empyema cavities is absolutely at variance with the truth. Scar contraction and the growth of granulation tissue, the expansion of the lung, collapse of the bony chest wall, changes in the mediastinal tissues, distortion of the spine, elevation of the diaphragm, may all, at one time or another, take part in the healing process. The mere weight of the pus in the cavity is of small import.

Hence, the incision may be made at any convenient point at which the abscess cavity can be reached.

The writer strongly deprecates the use of general anæsthetics in making these incisions, since they are highly dangerous in cases where the respiration and circulation are embarrassed. The resection of ribs is, in the main, unnecessary.

Hence, under Schleich's infiltration anæsthesia, an incision in a chest wall of moderate thickness is made one inch long over and paral-

lel to an inter-costal space near the lower of the two selected ribs. If the quantity of the pus present is considerable, and its presence and location have been demonstrated by the exploring syringe, the surgeon need have no hesitation in entering the pleural cavity with one or two strong knife cuts through the infiltrated area. Even if infiltration is incomplete, the amount of pain experienced is but slight. The operation is completed in a few seconds, and the patient experiences relief from the tension of the pus.

The knife, having been carried into the chest cavity, the flow of pus proves the fact that the pleura has been opened, a grooved director is made to follow the knife into the pleural cavity before the knife is withdrawn, and along the grooved director a single large drainage-tube is carried, with the aid of an artery forceps, well into the chest. Needless to say, the drainage-tube must be fastened so that it cannot slip in or out.

Continuous aspiration may be utilized to close rapidly a cavity of this kind, as recommended by the writer in the Journal of the American Medical Association, May 30, 1903.

The operation should be performed quickly and a bulky dressing applied in order that air may not immediately rush in and out through the opening, to the great discomfort of the patient.

Should complications arise in the performance of the operation by this method, such as the occurrence of hemorrhage, which, on account of the protected location of the intercostal artery, is not likely to take place, the operator has only to plug the wound with gauze and lengthen the incision in order to meet the difficulty according to the usual surgical indications.

FIGURE 3.—Showing the method of raising a relaxed gall-bladder to the surface for an operation through a small incision.

Cholecystostomy for cholecystitis and cholangitis, whether or not associated with gall-stones, will, in the writer's opinion, continue to be the operation most frequently elected for the treatment of those diseases. This is not the place for the discussion of this proposition, or for laying down the indications for the performance of cholecystostomy.

Assuming that cholecystostomy is to be performed, and that gall-stones may require removal from the gall-bladder, the writer proceeds as follows:

The site of the incision is at the outer end of the right rectus border. An incision through the rectus itself, while giving access to the tistues lying in the median line, is not so convenient for exploring the region in front of the kidney and below the right lobe of the liver, in which the gall-bladder is not infrequently located, and in which it is often held by adhesions.

The incision is a vertical one, since this direction enables one to enlarge the opening either upward or downward, as necessity may dictate. It is highly advantageous to make the incision a short one (three-quarters of an inch to an inch and a quarter) at the outset, and to locate the incision an inch or an inch and a half below the costal arch, so that if a long opening becomes necessary in the sequel, it may be provided either by cutting upward to the border of the ribs, downward, or in both directions.

The incision at once involves the skin and the aponeurosis of the external oblique. Muscles are incised under the guidance of the finger, or, as is the writer's usual practice, the muscle fibers may be separated without cutting, as in the McBurney-MacArthur operation for appendicitis. In thin women, the fascia transversa, as a rule, may be perforated by the finger, but if too dense, it may be punctured with the point of the knife, guided by the left fore-finger. At this point the entire incision is stretched slightly by the finger at one end of the wound, and an artery forceps or other blunt instrument at the other end. The peritoneum is opened, as a rule, by pressure with the finger tip. The operator can recognize, with accuracy, the condition of affairs just within the peritoneal cavity by palpation before the peritoneum is opened, but if rare conditions or lack of experience render him doubtful, he may easily grasp the peritoneum with an artery forceps, draw it to the surface, and divide with scissors.

Having entered the peritoneal cavity, the wound is again stretched as before, and the intra-abdominal work begun.

The exploration of this region of the abdomen with the finger alone demands absolute familiarity with the technique of abdominal operations, and a comprehensive, practical knowledge of the normal and morbid anatomy of the region.

FIGURE 4.—The gall-bladder raised to a level with the aponeurosis and fastened to it by two sutures. A piece of drainage gauze is placed above and another below the gall-bladder.

The landmarks sought are the surface and edge of the liver, the former smooth, the latter sharp; the lobular, irregular surface of the omentum, which is sometimes present; and the hepatic flexure of the colon, which is usually recognized as an intestine by the fact that it contains gas. Beneath the edge of the liver, the gall-bladder is first to be sought. If adhesions are present, and are not easily broken up, the operator, as a rule, would do well to enlarge his incision sufficiently to enable him to follow the usual technique. Should the colon and liver not be adherent, the gall-bladder, as a rule, would be found at its normal site; but if the finger does not meet it here, it should be

sought far over to the right, where, either with or without adhesions, it may lie in the hepatic fossa. It is also possible for it to occupy a position toward the median line. The recognition of the gall-bladder is, as a rule, not difficult. It may be thin-walled and distended with bile, mucus, or muco-pus. Gall-stones may be felt through the wall of the gall-bladder, or the walls of the organ may be thick or retracted. If the viscus be recognized with reasonable certainty, and if the examination has satisfied the operator that cholecystostomy is indicated, the wall of the gall-bladder's apex may be seized with small artery forceps armed with fine teeth and drawn to the surface. The jaws of the artery forceps must not be locked. The walls of the gall-bladder are often rendered fragile by infiltration, and too much pressure might lacerate them. When the gall-bladder has been drawn toward the abdominal opening, an additional forceps may be placed by the side of the first pair, at a distance of half an inch, in order to increase the amount of force to be applied in drawing out the organ.

FIGURE 5.—The operation completed, with the gall-bladder attached to the aponeurosis. Sutures, gauze, and drainage-tube in position.

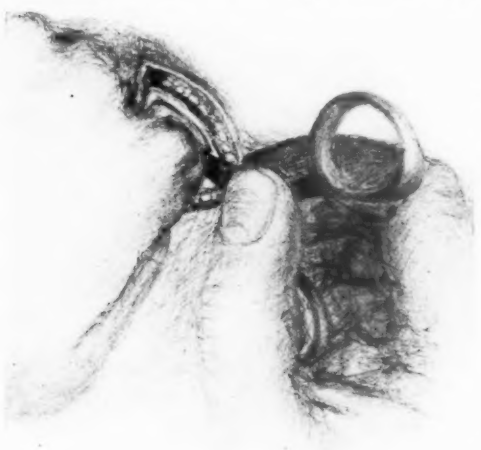

FIGURE 6.—Showing method of raising the appendix out of the wound.

The organ having been satisfactorily drawn forward, a single stitch is applied on each side, loosely attaching the gall-bladder to the aponeurosis. If these sutures are of medium-sized catgut, they will loosen up after a few days, allowing the gall-bladder to retract within the abdomen, maintaining the connection only by slight adhesions to the abdominal wall. This is a point of great importance, since the retraction of the gall-bladder favors the closure of the fistula. A strip of drainage gauze, an inch and one-half wide and four layers thick, is packed above and another below the gall-bladder deep into the abdomen. These strips are to be left for thirty-six hours.

The gall-bladder is opened with the scissors, the edge of the organ being held in position with the forceps. The finger is to be introduced into the gall-bladder, and any stones present are to be removed with the aid of stone forceps. Cultures should be made before the finger is introduced. After the removal of the stones, a large drainage-tube should be introduced

and fastened in place with a stitch through the skin.

The writer is in the habit of draining an infected gall-bladder for several weeks. Tubes of successively diminishing caliber should be used until only a fine fistula is left, which is closed by repeated cauterizations with silver nitrate fused upon a small probe.

The operation for chronic *appendicitis* is performed as follows:

The incision is made parallel with the fibers of the external oblique aponeurosis at a point slightly above McBurney's point. The length of the incision should be just sufficient to admit the operator's finger. It should be remembered that the skin readily stretches, and that it is easy to make the incision too long. The writer uses an incision three-quarters of an inch to an inch in length in the majority of cases. The aponeurosis of the external oblique is divided by an incision parallel to its fibers. The external oblique muscle is then bored into with the fore-finger, a closed artery forceps being introduced by its side. The artery forceps being carried away from the finger, the fibers are thus separated until the deeper muscles are reached, when the same manœuver is executed in a different direction. The pro-peritoneal fat and the peritoneum are opened, preferably by pressure with the finger; for this purpose the

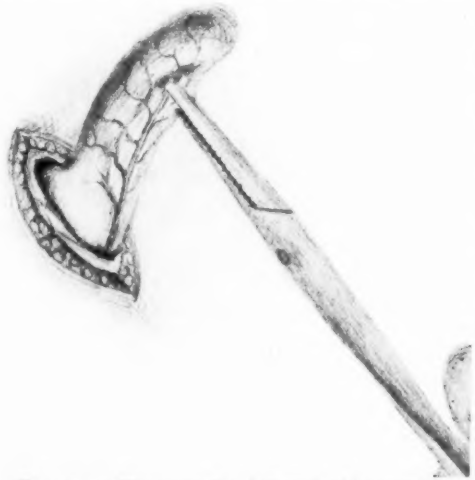

FIGURE 7.—The appendix delivered with a portion of the cæcum out of the wound.

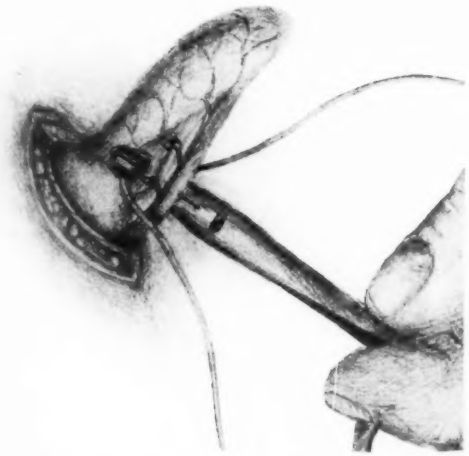

FIGURE 8.—A ligature about to be placed around the mesenteriolum.

finger must be pushed inward quite strongly, and the peritoneum must be ruptured by steady pressure at a point opposite the opening in the muscles. If the operator does not wish to carry out this portion of the plan in the manner described, he has the option of lifting the peritoneum with artery forceps and incising it with scissors in the usual manner.

When no adhesions are present between the peritoneum at the point of incision and intra-abdominal structures, the peritoneum freely bags before the oncoming finger, but if adhesions are present, they can be recognized by the failure of the peritoneum to move so readily, and by the operator's inability to push aside intra-abdominal structures.

The peritoneum having been opened, the finger is swept around within the peritoneum to note the conditions present, the entire wound is gently stretched with the finger and an artery forceps, and the search for the appendix is begun.

With some practice, the appendix is usually found with ease. The operator must take care that his manipulations do not carry the appendix away from the wound. The finger must be introduced into the depths of the abdomen slowly and carefully. The appendix is most likely to be found by carrying the finger down-

FIGURE 9.—The peritoneum raised for closure.

ward and inward along the abdominal wall toward the base of the cæcum. If the appendix is free, it can, as a rule, be felt as a rounded, smooth body eluding the grasp of the finger.

Once it is palpated, if adhesions are present, they are to be cautiously broken up with the finger. In their presence, the inexperienced operator may find conditions demanding a longer incision, which will enable him to operate under visual control. The operator who has done much of this work can separate very extensive adhesions without risk.

The appendix having been found, it is to be seized with mouse-toothed artery forceps, of course without locking the branches of the instrument, and gently drawn out through the incision. As a rule, the distal end is drawn out first, but with some care it may be seized at any point and extracted without damage. An assistant now holds up the appendix and the portion of cæcum to which it is attached while the operator passes an artery forceps through the mesenteriolum as near the intestine as possible.

FIGURE 10.—Bringing together the muscles.

FIGURE 11.—Approximating the aponeurosis of the external oblique.

While the appendix is being held out of the wound, a thin but strong ligature of catgut is tied about the mesenteriolum at as low a level as possible. The mesenteriolum is then grasped between the ligature and the appendix, and the appendix is cut away from the mesenteriolum by an incision passing as close to the appendix as convenient. The appendix itself is then removed by any technique the operator wishes to pursue. The wound in the cæcum and mesenteriolum is inspected, to make sure that no hemorrhage is going on, and the cæcum

is pushed back into the abdomen at the point of the finger, the operator being assured by palpation that all is in order within the abdomen. Then, on partially withdrawing the finger, the smooth peritoneum is pulled up on its volar surface, toward the outer opening. An open artery forceps is carried down upon the finger till the peritoneum can be grasped and drawn forward out of the wound. The first forceps, having been pulled out in this manner, with the peritoneum in its jaws, other forceps are applied at intervals of one-fourth to one-half an inch until the entire opening in the peritoneum is drawn out. This manœuver is performed with greater ease in proportion to the thinness of the abdominal walls. Even if the peritoneum cannot be wholly withdrawn, the opening can be closed by a purse-string suture. The peritoneum having been closed in this way and pushed back to its proper level by the finger, the two muscular layers are treated in the same manner by the use of one or two stitches. The aponeurosis is closed with great care, and finally the skin is brought together with one or two stitches.

In acute appendicitis the technique is precisely the same as that described, except when upon opening the abdomen the operator recognizes the existence of a peritoneal infection.

FIGURE 12.—Drainage gauze in position in a case of acute suppurating peritonitis.

FIGURE 13.—Showing the scar from appendicitis operation one year before, and that from gall-bladder operation six weeks ago, the latter still draining.

This leads to the presumption that the appendix is perforated. The operator may, if he wish, introduce, through an incision not more than one inch long, two to four strips of drainage gauze one and one-half inches wide, four layers thick, and fourteen to eighteen inches long. These strips may be so applied as to give protection to the peritoneum while the operator opens an abscess or removes the appendix. After the removal of the appendix, other strips may be introduced until the opening is filled. The strips are to be left long, and are to be dressed at the patient's back, in order that the discharges from the wound may be delivered with maximum rapidity into the masses of hydrophile dressing material placed at the lowest level.

While the withdrawal of this gauze at the end of thirty-six or forty-eight hours does not leave a wound absolutely free of liability to the formation of hernias, nevertheless, hernias do not form with such frequency and of such size as are observed when longer incisions are made.

FIGURE 14.—Showing small abdominal incisions used in a case requiring operation for appendicitis and gall-stones.

As a rule *supra-pubic cystotomy* may be performed under the established rules and precedents of the text-books of operative surgery. Special conditions may make it desirable to perform the operation through a short incision, e. g., where simple drainage is desired. Where the supra-pubic is selected in preference to the perineal route, a short incision may be used.

In Trendelenburg's position (which may be obtained extemporaneously by elevating upon an ordinary chair a common kitchen table), with the bladder moderately distended with water—say six ounces—the operation is begun by an incision one inch in length just above the pubic bone. An incision of corresponding length is made through the linea alba, beginning at the pubic bone. This incision may be made by the sense of touch, the left fore-finger guiding the knife. The muscle bellies are separated with the finger when the fat of the cavity of Retzius will be recognized by the palpating finger. It is at this point where such special skill as may be required must be invoked. Hugging the upper surface of the pubic bone, the finger passes down into the pelvis directly toward the neck of the bladder. The pre-vesical fat is lifted up with the finger acting as a hook, and is thus stripped off the wall of the bladder. At the same moment the bladder wall is palpated, and is recognized by its fluctuating feel. With the fore-finger still in the wound, and acting as a guide, an incision can now be made through the bladder wall with the point of the knife. The incision must not be made too near the neck of the bladder, lest dilated veins be injured, or too high up for fear of wounding the peritoneum; but within these limits there is an abundance of room which the operator may easily use if he is familiar with his anatomy.

The finger is next introduced into the opening into the bladder before the escape of much of the water which had distended the viscus; one side of the wound in the bladder is caught with the mouse-toothed artery forceps, guided by the finger, and this artery forceps is held by an assistant. Another artery forceps having

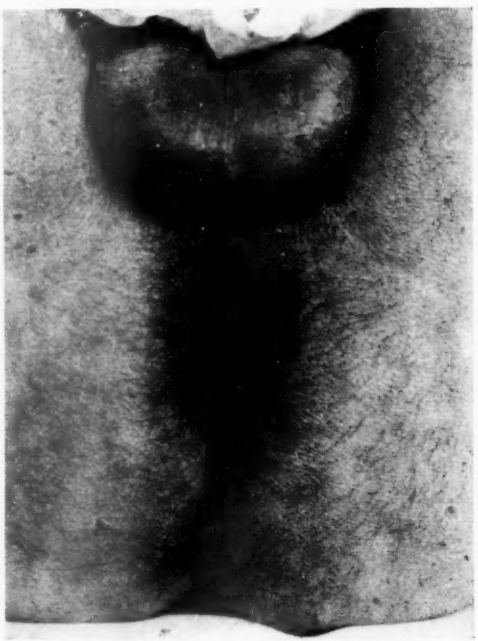

FIGURE 15.—Scar resulting from a prostatectomy several months before.

been placed on the opposite side of the wound, the operator may, having lifted up the wall of the bladder, fasten the organ to the abdominal wall with a suture in a short, curved needle carried down under guidance of the finger.

The bladder, having been permanently drawn forward, a small stone, if present, may be withdrawn, or if the drainage be the sole indication for the operation, a tube may be introduced.

If the peritoneum has been well out of the way, and if the incision has been made fairly low in the pelvis, hemorrhage is practically the only complication at all likely to occur. It may be dealt with by the application of an artery forceps, to be left in place for a few hours, or by enlarging the incision and the application of a ligature.

The incision of one inch to one inch and a quarter, used by the writer in his method of *perineal prostatectomy*, is described in his paper on that subject published in the New York Medical Journal, July 4, 1903. Such incisions frequently contract when healing is complete to a line not more than one-half inch in length.

In concluding this paper, the writer wishes again to insist upon the caution with which he began, that incisions are never to be made so short as to hinder the operator from doing his very best work upon the morbid condition in hand.

The writer is under obligations to Dr. Franz H. Brandt for the drawings, and to Drs. C. E. Boys and H. M. Richter for the photographs used in this article.

POST-OPERATIVE VOMITING [1]

By DR. EUGENE BOISE, OF GRAND RAPIDS, MICH.

IT is not necessary to discuss the physiology of the act of vomiting, inasmuch as, whatever the cause, and through whatever channels it may be received, the muscles involved are always the same. We may justly assume, even if it is not absolutely demonstrated, that there is a vomiting center and that the act is generally both reflex and complex.

The exciting impluse may reach this vomiting center through various channels and thence be reflected to the various muscles concerned in the act of vomiting. It may act directly on this center, as in the case of apomorphia, various toxins, etc., or it may be received at a point distant from this center and carried to it through various channels. For instance there may be

1st. Direct irritation of the mucous membrane and nerves of the stomach.

2d. Injury to or inflammation of certain parts of the brain.

3d. Circulatory depression, etc.

4th. Disturbance of equilibrium, as from swinging, whirling, etc.

5th. Sensory impressions, as of sight, smell, etc.

6th. Mental impressions.

But the question that concerns us, as surgeons, is: What is the cause, or the combination of causes, that produces vomiting after anæsthesia?

The consideration of this question is by no means simple, and an accurate answer may be impossible; but it behooves us to formulate, as well as we can, the facts that we know in order that we may obtain a more definite idea as to the conditions which lead to post-operative vomiting.

By grouping these under various heads we shall be able to consider them more systematically and arrive at more well-defined conclusions. Therefore we will study

1st. Those conditions pertaining to the anæsthetic itself.

2d. Those pertaining to the general condition and surroundings of the patient; and

3d. Those pertaining to the condition of the stomach itself.

The clinical history of anæsthesia shows

[1] Read at the meeting of the American Gynecological Society, at Niagara Falls, May 25, 1905.

that the anæsthetic first excites the vomiting center by its direct irritant action. Then as anæsthesia becomes profound, the sensitiveness of this center is obtunded, to be again excited as the anæsthetic is withdrawn.

It is a fair inference therefore that chloroform and ether act directly on the vomiting center as excitants.

Nothnagel,[1] in studying the pathologic effects of chloroform and ether on the various cells of the body, found overwhelming evidence of specific toxic effects, whether the animal died from the anæsthetic or not. These effects occurred whether the chloroform was given by inhalation or directly into the stomach, but the intensity of the effects varied according to the amount used.

Waller[2] found that the electrical reaction of isolated nerves becomes suspended merely or ceases permanently according to the percentage of chloroform used and the time of exposure.

Fenton B. Turck,[3] in investigating the question of shock from anæsthesia, without surgical operation, not only found the anæsthetic constantly in the blood and saturating the mucous membrane of the stomach and intestines, but also found a greater or less amount of toxins both in the blood and secretions of the stomach, especially in cases where shock was produced.

He says: "These observations [concerning anæsthesia] would seem to prove that . . . the toxicity of the blood may be increased through toxins elaborated *by the direct effect of anæsthesia*, and by the retention [by reason of anæsthesia] of poisonous matters which are normally excreted."

Therefore we may say that the conditions pertaining to the anæsthetic are, that in addition to its acting as a direct excitant of the vomiting center, it also (as numerous experimenters have shown) lessens the resistance of the blood serum to poisons; that it impairs the motility of the stomach and intestines and thus tends directly to promote the elaboration of toxins through bacterial growth and their absorption into the blood; that it retards elimination. Also that, when used in any considerable quantity, it causes circulatory depression which varies in intensity according to the amount of the anæsthetic used and the duration of anæsthesia, and that circulatory depression predisposes to vomiting.

In considering those facts connected with the general condition and surroundings of the patient, which tend to the production of post-operative vomiting, we may embrace all in the statement that whatever tends to anæmia, to toxæmia or septicæmia, and to circulatory depression, predisposes to vomiting after anæsthesia.

All chronic pathological conditions calling for operative relief, and all chronic digestive disturbances tend to anæmia, and anæmia causes irritability of the nerve centers, including the vaso-motor, respiratory and vomiting centers.

Toxæmia, of whatever origin, predisposes to vomiting. And the sources of toxæmia are many. Imperfect metabolism, imperfect elimination, cholæmia, uræmia and the various toxins resulting from gastro-intestinal atony or the breathing of vitiated air, all tend to such poisoning of the blood serum as will impair all physiological processes. If the intoxication is a gradual process, the nerve centers may, to a certain extent, adapt themselves, but nevertheless, all toxins circulating in the blood do predispose to vomiting, and an exciting cause, which in itself would be unable to excite this act, will prove effective when operating on a vomiting center rendered irritable by long continued exposure to poisoned blood serum.

Again, whatever tends either to chronic or acute depression of the circulation, predisposes to vomiting after anæsthesia.

We have already stated that long-continued illness, lack of nutrition, unhealthy surroundings and habits of life, imperfect digestion, etc., tend to anæmia and circulatory depression and consequent hyper-sensitiveness of the vomiting center. But in addition to these, causes incident to the operation itself play a very important part in circulatory changes, such as

1st. Long-continued operative procedures.

2d. Unnecessarily profound anæsthetization.

[1] Berliner Klin. Wochen, 1866, LLL.
[2] Brain, London, Vols. XVIII-XIX, 1895.
[3] Jour. of Am. Med. Assn., May 2, 1903.

3d. Extensive exposure to air of intra-abdominal viscera.

4th. Prolonged intra-abdominal manipulation.

5th. Too low temperature of operating room.

These causes tend to the production of shock, but also predispose to severe post-operative vomiting.

When we consider those causes of vomiting which pertain to the stomach itself, we are brought to those which, in the opinion of many operators, are the principal if not the only causes of vomiting after operation.

White[1] argues that the presence of the anæsthetic in the tissues and secretions of the stomach, together with the toxins produced through its agency, is the sole cause of this vomiting, through the irritation of the nerves of the stomach. He claims that thorough washing out of the stomach before the patient is removed from the operating table will prevent vomiting in the great majority of cases.

While we cannot accept the statement that the condition of the stomach is the only agency in the production of post-operative vomiting, we, on the other hand, cannot deny that it plays a very important part. The more normal the digestive processes the less tendency is there to vomiting.

Food in the stomach does not necessarily cause vomiting. It often happens that operation must be undertaken immediately after a meal, and though the patient is profoundly anæsthetized, vomiting does not occur. But it is nevertheless very desirable that the stomach shall be empty, because, aside from the danger to the air passages from the vomiting of undigested food, such food rapidly becomes a source of irritation to the mucous membrane of the stomach through fermentation. Anæsthesia impairs the motility of the stomach, hinders digestion and encourages and promotes fermentation; and even without anæsthesia the fermentation of undigested food tends to acute vomiting. Dyspepsia of long standing, dilatation and atony of the stomach, all predispose to vomiting through the irritation of the vitiated secretions and toxins, acting on the super-sensitive gastric nerves.

[1] Annals of Surg., Sept. 19, 1904.

The condition of a normal, healthy stomach under profound anæthesia is this: Its motility is temporarily impaired or abolished. Its mucous membrane, muscular and glandular tissues are saturated with the anæsthetic and with certain toxic elements which owe their origin to the anæsthetic. Its nerves are in a condition of more or less irritability, and yet there may be no vomiting nor even nausea. If, however, some foreign body be introduced into the stomach, even if it be only water, secretion is stimulated and the chloroform-laden mucus and gastric juice are poured into the stomach and vomiting occurs. While the stomach is quiet and empty it matters comparatively little how saturated its tissues are with the anæsthetic, its nerves are not thereby irritated. But when the anæsthetic is brought into direct contact with the terminal filaments of these nerves, through gastric secretion, an impulse of irritation is carried at once to the vomiting center.

It may be said that no two patients are affected alike in the matter of vomiting after an anæsthetic. This is largely a matter of resistance to the irritation of the anæsthetic and of the resultant toxins, but the element of elimination also plays an important part.

There are many who are not appreciably nauseated, even after prolonged anæsthesia. Others vomit once or twice and then have no further trouble, while still others vomit for days, even after the anæsthetic has been practically removed or eliminated from the system.

In all of us there is a normal physiological resistance to all forms of poisons. Chloroform and ether lessen this resistance. Those who do not vomit after an anæsthetic have a normal vomiting center. It has not been rendered hyper-sensitive by long-continued irritation or imperfect nutrition. It can resist the irritation of the anæsthetic. The normal blood serum neutralizes the various toxins resultant from the anæsthesia, and elimination is free and unrestricted. The normal equilibrium is not destroyed.

Those who only vomit a few times and then rally have sufficient resistance to rapidly overcome the irritation and to rapidly return to their ordinary condition.

But those who vomit so long and so severely

have abnormally irritable nervous systems. There is circulatory depression, excessive irritability of the vomiting center and greatly impaired resistance to toxins, which, therefore, rapidly accumulate in the stomach and blood, and even after all chloroform or ether has been eliminated these continue the irritation of the afferent nerves and of the vomiting center, and vomiting persists.

If this presentation of the conditions that tend to the occurrence of post-operative vomiting be accepted, the conclusion naturally follows that there is no specific, and that effective treatment must be preventive as well as curative.

We must overcome, as far as possible, those causes that *predispose* to vomiting, as well as the exciting causes. Therefore we must pay more attention to the preparation of our patients. Where possible this should not be confined to the few hours preceding operation, but should receive close and careful attention for days, if not for weeks. We must keep in mind that in all chronic conditions leading to operation, the system is generally more or less saturated with poisons; elimination is imperfect; by reason of anæmia and imperfect nutrition all the nerve centers are abnormally irritable, and, generally, the condition of the stomach is far from healthy. Preventive or preparatory treatment must therefore be along these lines, and must be undertaken early enough to restore, as far as possible, normal conditions.

No two patients are alike, and therefore no positive rules can be promulgated as to preventive treatment.

In our efforts to prevent vomiting, as well as in our efforts to check it, we must keep four conditions in mind:

1st. The abnormal irritability of the vomiting center.

2d. The condition of the stomach.

3d. The condition of the blood; and

4th. The condition of elimination.

When a patient is profoundly narcotized by the anæsthetic, he does not vomit, though he may vomit, and often does, just before profound anæsthesia, and again when recovering from the anæsthetic. This is not because of the condition of the stomach but because of the direct action of the anæsthetic on the vomiting center.

It is therefore a natural inference that if we can find some remedy that will obtund the sensibility of this center until the anæsthetic has been largely eliminated, we shall remove one factor that tends to cause vomiting.

Again, in those cases where vomiting does not occur till, by the introduction of something into the stomach, free secretion into that organ takes place, it is a natural inference that the vomiting is induced by the irritating character of the secretions and their action on the super-sensitive nerves of the stomach. In these cases no remedy is equal to gastric lavage. It removes secretions laden with the anæsthetic and toxins and at the same time is soothing to the gastric nerves.

To aid elimination, rectal infusions of *hot* saline solutions are to be used. When so applied as to bathe the transverse colon, they have a double favorable action. They not only wash the blood and promote elimination, but they equalize the circulation by the effect of the heat on the solar plexus and the splanchnic system.

Many remedies for post-operative vomiting have been suggested. We cannot attempt to consider all, but will instance two or three as types.

The inhalation of vinegar, begun immediately after the cessation of the anæsthetic and continued till its elimination has been largely accomplished, has been recommended. It is said to act chemically on the anæsthetic, neutralizing its irritant character. To be effective it must be faithfully and continuously used.

The administration of large doses of bismuth or chloretone just before the anæsthetic is also recommended.

These are supposed to have a soothing influence on the mucous membrane and nerves of the stomach, and possibly, in the case of chloretone, on the vomiting center.

Lavage is also largely used. It may be instituted immediately after the operation, as recommended by White, if it seem best, and continued as indicated.

General nutrition, by enemata, is often essential in debilitated cases.

No specific can be given. All cases must be studied and treated according to the conditions.

Theoretically the indications are to obtund the sensitiveness of the vomiting center; to neutralize, if possible, the irritant character of the anæsthetic; to cleanse and soothe the stomach; to keep the patient quiet in order to avoid circulatory disturbances; to aid elimination; to support the patient and nourish the irritated nerve centers by rectal feeding when indicated, and to control the neurotic element which so frequently is the causative factor in cases of persistent vomiting.

APPENDICITIS AND PREGNANCY

By J. CLARENCE WEBSTER, M.D., CHICAGO

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WITHIN recent years considerable attention has been given to this subject, Mundé, in 1893, being the first to refer to it in this country. In 1897 Abrahams collected only eleven cases reported by American authors and added four others observed by himself. Since that time a very considerable number of cases have been reported both in Europe and America. The disease is more common than is suspected, being undoubtedly often overlooked because the symptoms and signs in many cases are not sufficiently pronounced to lead to careful investigation or are classed among the various disturbances which are so frequent in the pregnant condition. The great majority of reported cases have been those in which the phenomena have been distinct or alarming. According to Donoghue eighty per cent of these have occurred during the first six months of gestation.

So far as is known pregnancy does not favor the occurrence of primary appendicitis. In cases in which there has been previous inflammation in or around the appendix, pregnancy may increase the liability to an exacerbation. Increased vascular engorgement and constipation may be factors which exert a harmful influence. But the most important element may be mechanical, viz., pressure of the growing uterus on the appendix and cecum or the stretching of adhesions. The latter factor is likely to be most serious when the appendix is adherent to the broad ligament or pelvic viscera which are considerably displaced upward by the pregnancy.

Several cases have been observed in which a woman has had definite attacks in successive pregnancies.

The seriousness of appendicitis is certainly increased by the complication of gestation, especially in suppurative cases, the risk being greater the more advanced the pregnancy. The mortality following perforation, whether operated immediately or not, is very high. In cases in which the periappendical suppuration is localized, the danger is far more pronounced than in the non-pregnant state, because spontaneous emptying of the uterus tends to take place.

The alteration in the size and position of the uterus which is thereby produced is apt to lead to rupture of adhesions, bursting of the abscess cavity and general extension of infection. Even when such areas are opened and drained, there is still a much greater risk than in the case of non-pregnant women.

The occurrence of appendicitis soon after labor is in some cases undoubtedly due to the mechanical changes in the uterus and adnexa. Under these circumstances an appendix may be stretched, twisted or even ruptured and a severe local or generalized infective process may be started and the wall of the uterus may be invaded. Doubtless, such an attack is not infrequently diagnosed as "puerperal infection" in the absence of careful bacteriologic examination of the interior of the uterus, and because the symptoms of acute peritoneal infection of appendical origin may resemble so closely those following extension from the tube and uterus. Several cases have been reported

in which the appendix was the source of infection, supposed to be "puerperal."

As regards the influence of appendicitis on the gestation, it is certain that there is no interference in slight cases or even, sometimes, in sharp attacks where there is no suppuration. But, generally, in severe disturbance, especially where an abscess or general peritonitis develops, there is a tendency to emptying of the uterus, and to fetal death. Infection may extend to the uterus and its contents, or the fetus may be affected by the high temperature and the circulating toxic matter. In some cases, however, in advanced gestation a living fetus is expelled, though it is not likely to survive if the patient has been septic for some time previous to delivery.

Diagnosis.— The diagnosis of appendicitis in pregnancy is sometimes easy, but is often uncertain. When the characteristic typical features of an acute attack occur, they are generally recognized, but in other circumstances it may be difficult to form an opinion. In slight cases the nausea which may be present is apt to be considered as due to the pregnancy. Pains may be regarded as due to old pelvic inflammation, or, in some cases, to threatening of miscarriage. Leucocytosis may be thought to be due to pregnancy.

Whenever fever accurs with pain in the right side and nausea, the possibility of appendicitis as a cause should be kept in mind. An infective process in the ureter or pelvic organs, gallbladder or right kidney, various gastro-intestinal disorders, and other conditions may produce somewhat similar symptoms, and, thus, an error in diagnosis may easily arise. A severe sudden attack may simulate rupture of an ectopic gestation, but with the latter there is usually more or less evidence of loss of blood without fever.

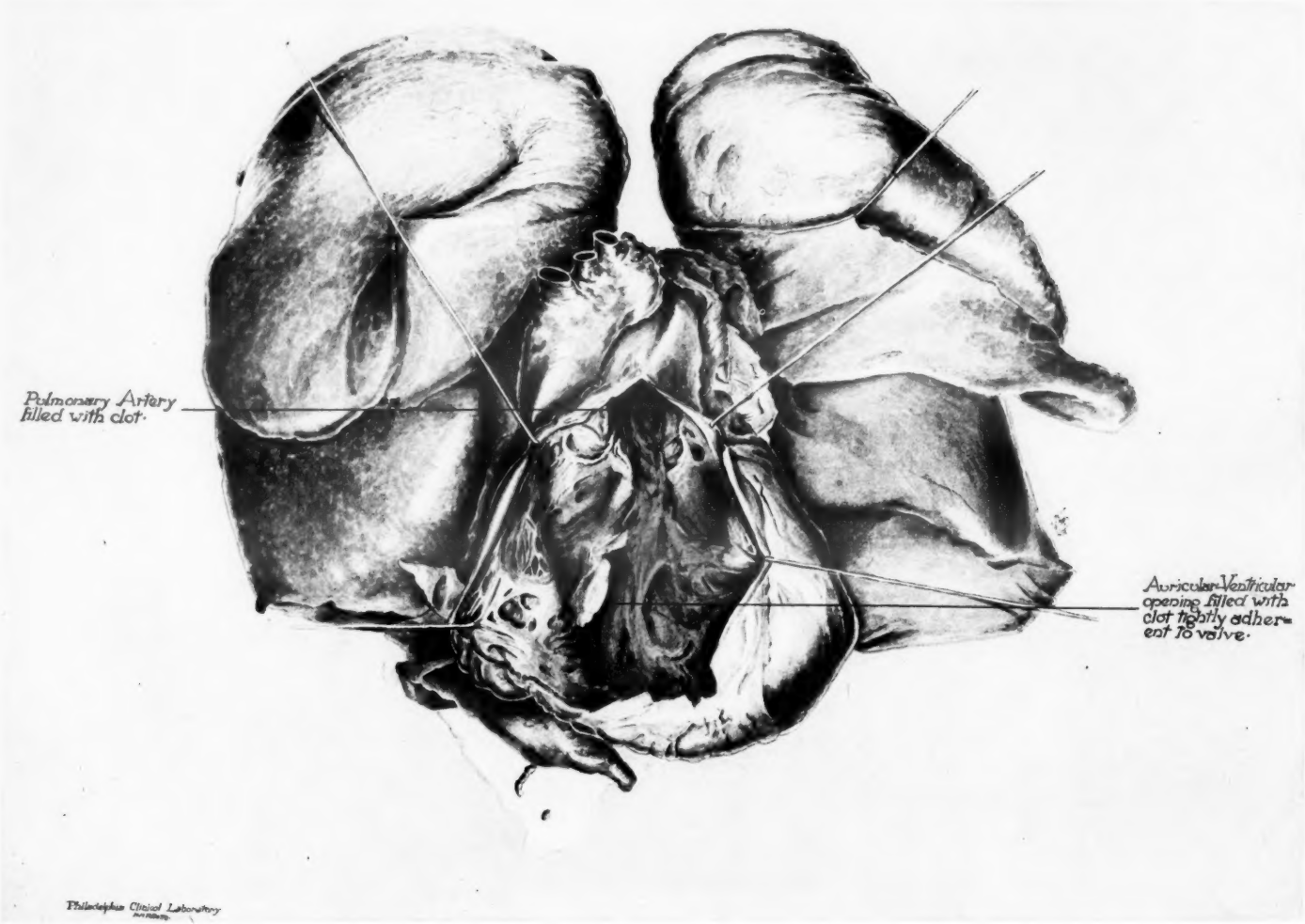
When a local abscess forms the mass may be mistaken for a tumor. In one case observed in consultation by the author, the pus extended on one side deeply into the pelvis and displaced the pregnant uterus towards the opposite side, so that it was believed to be an ectopic gestation.

Treatment.— Every non-pregnant woman who is likely to become pregnant, in whom a definite attack of appendicitis has once occurred, should have her appendix removed before pregnancy is allowed to take place, as a prophylactic measure. When the condition is diagnosed for the first time during gestation, or when there is a recurrence of an old attack, it is advisable to operate as early as possible. The earlier in pregnancy the operation is performed the more satisfactory is the result and the stronger the abdominal wall if the patient goes to full time. There is always a risk of interrupting pregnancy by the operation, and this is probably increased if the latter be prolonged or the viscera be handled excessively. In suppurative cases this risk is very much greater. The most troublesome cases are those in which drainage must be employed, since during healing adhesions are apt to form on the right side of the uterus which may lead to distress or tenderness if pregnancy continues and may interfere with the action of the uterus during labor. Moreover, the scar area may be weakened and herniation may occur. If premature emptying of the uterus takes place during drainage, there is a risk of infection of the genital tract by the discharge. When general peritonitis is present, the outlook is very serious. Free drainage is necessary but is difficult to carry out satisfactorily if pregnancy be at all advanced.

In all acute cases in advanced pregnancy Marx advises *accouchement forcé* at first, followed by the abdominal operation. This suggestion is a good one because it enables the abdominal drainage, which may be necessary, to be more thoroughly carried out. It would not be advisable to adopt this procedure in cases in which a localized abscess is present because of the risk of rupturing the latter by the change in size and position of the uterus which may form part of its wall.

When an attack of appendicitis occurs during labor, operative interference should be carried out very soon after delivery. An abdominal operation should also be performed when the disease develops in the puerperium.

The method of incision generally favored is McBurney's. The technic is that ordinarily employed in non-pregnant cases.


Pulmonary Artery
filled with clot.
Auricular-Ventricular
opening filled with
clot tightly adher-
ent to valve.
Philadelphia Clinical Laboratory

SUDDEN DEATH DURING OR IMMEDIATELY AFTER THE TERMINATION OF PREGNANCY OR OPERATION ON THE PELVIC ORGANS IN WOMEN[1]

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THE following cases in the experience of the writer are reported as typical of the condition under discussion:

CASE I. A woman aged 20, illegitimately pregnant, had a criminal abortion, probably by a sound. During the night following, pain and hemorrhage occurred. A physician summoned to attend her found the placenta retained. When seen in consultation, the patient was in fairly good condition. Hemorrhage had ceased. The pulse was rapid but fairly strong. Shortly after, the patient was given ether by the practitioner in attendance, and the placenta was removed by the finger and a blunt curette. The uterus was irrigated and packed with gauze. During the operation the patient became asphyxiated and died. An autopsy by the coroner's physician found no cause for death. There was no hemorrhage, and the physician who gave the ether saw nothing to alarm him, until the patient suddenly became asphyxiated.

CASE II. A primipara, aged about 25, with ample pelvis and tall, became a widow soon after marriage. She had typhoid fever and measles, and, three years before, had been thrown from a carriage, tearing a ligament near the pubes. Had suffered from nosebleed and congestion about the head. During pregnancy, under a selected diet, the urine contained an excess of solid waste.

During pregnancy the patient had an attack of grip, with obstinate bronchial catarrh, muco-purulent expectoration. This condition persisted for some time in spite of treatment. The patient took exercise during pregnancy, and occasionally complained of slight dyspnoea. Examination of the thoracic organs revealed only a slight catarrh of the larger bronchial tubes. Labor was spontaneous, the patient resting during the first stage, and taking liquid nourishment. A discharge of amniotic liquid occurred 5 hours after the beginning of pains. Twelve hours after the first sign of labor, dilatation was three-fourths complete, the head in the pelvic cavity, the back to the left, and rotation partly completed. The uterine contractions were normal, the head gradually descended, rotated slowly until it reached the pelvic floor. Fourteen hours after the first sign of labor, the patient's general condition was good, but she complained of suffering severely and desired relief. Consent was obtained to deliver by forceps. The patient was anaesthetized in bed, placed upon a table, and a male child, weighing 9 pounds 14 ounces, was delivered without difficulty; a very slight tear of the plevic floor occurred. The child soon breathed, and the cord was tied and cut. As the placenta separated slowly, it was delivered by a gloved hand, the uterus followed down, and strychnia, atropin and ergot given by hypodermatic injection. The uterus contracted promptly and well. After the uterus had contracted, the patient had a convulsive respiratory movement, and closed the jaws with partial asphyxia. The mouth was readily opened and the tongue pulled forward, when respiration improved. During the delivery, the pulse rose from 85 to 90, and at the time when the first respiratory failure occurred the pulse was 90 and of good quality. The patient was at once placed in bed and additional stimulation was given by hypodermatic injections and the Faradic current employed over the heart. A medical consultant saw the case at once. Respiratory failure occurred first, and was complete in 45 minutes after the birth of the child. Cardiac failure was complete 10 minutes later. There was no autopsy.

Four and one-half ounces of Squibb's

[1] Read before the American Gynecological Society, May 27, 1905.

ether, from a freshly opened can, was administered on gauze by a skilled anaesthetizer. The pulse was counted during delivery and did not rise above 90; its quality remaining good. The patient had been under intense mental strain during her pregnancy, and had been very apprehensive concerning the life of her child and herself. Hypodermatic stimulation was given, so soon as the uterus was emptied, to prevent hemorrhage; and bleeding did not occur. In the absence of an autopsy, a positive diagnosis was impossible. Pulmonary embolism seemed the most probable cause of death.

CASE III. Aged 38. Married. Family history, disease of the heart and nervous system. Patient was delicate in childhood. Broke down nervously at 24. Married at 34. One child. Difficult labor. Lacerations of the perineum and cervix, with primary repair of the perineum. Cervix repaired later. Had fever after childbirth, and made a very slow recovery. In a rest cure, when first seen in consultation with Dr. F. X. Dercum, the patient had developed severe pain in the lower abdomen with thrombosis of the veins of the left lower extremity.

Nephritis was also present, and the patient's pulse was rapid and feeble, and temperature elevated. The urine contained an abundance of albumin with granular and hyalin casts, cylindroids and leucocytes. The blood contained haemoglobin, 70 per cent, red blood cells, 3,930,000, white blood cells, 17,400. The leucocytes were polynuclear, 83 per cent lymphysites, 9 per cent hyalin, 8 per cent eosinophile. Vaginal examination showed pelvic peritonitis on the left side of the uterus, with slight diminution of the mobility of the uterus, but with an absence of a decided tumor. Operation was considered not indicated, and under medical treatment, the patient slowly improved. The thrombosis extended to the right side in lesser degree.

During the next two months, the patient's general condition steadily improved. Her urine became normal. She gained in weight, her pulse and temperature remaining normal. Vaginal examination showed the uterus movable, while tenderness disappeared, and no enlargement of the veins could be detected. Believing a focus of infection existed in the pelvis, whose presence exposed the patient to the danger of repeated attacks like that from which she had recovered, the patient and her husband requested operation to remove diseased tissue, and also to make impossible further conception. The risks of operation were fully explained and accepted. It was decided to practice exploratory abdominal incision, and to remove such organs as were found diseased.

On opening the abdomen, adhesions between the tube and surrounding tissues were found on the left side. The ovaries were partially cystic. The body of the uterus somewhat enlarged. Adhesions were broken up. The body of the uterus, tubes and ovaries were removed. The edges of the broad ligaments were sutured, and peritoneum was stitched over the stump. The patient passed through the operation well. Six hours afterward, she developed rapid pulse, without positive signs of hemorrhage. Under medical treatment, her condition of intense nervousness and rapid, feeble pulse, improved. She began to take food by the stomach, and seemed improving. Forty-eight hours after the operation, she seemed better, with good color and resting quietly. Shortly afterward, on waking from sleep, she had a few moments of dyspnoea and died quietly. The action of the heart continued after respiration ceased.

At autopsy, there was found dark clotted blood in the pelvis and in the renal fossae, the whole quantity being slight, and removed by one medium-sized sponge. Ligatures and sutures were in position. After inspection, the tissues at the field of operation were removed for examination. A very small clot of blood was found between the layers of the broad ligament on the right side. Each suture and ligature was examined and found holding tightly. No source of hemorrhage was found. Blood found in the abdomen and pelvis, was insignificant in quantity. Serosanguineous fluid was found in the pleural cavity and in the pericardium. On examining the heart, its muscle was slightly thinner than normal, and a white fibrous clot extended from the bifurcation of the pulmonary artery into the right side of the heart, distinctly adherent and

continuous, with another clot extending through the right auricle. The appearance and consistence of this clot left no doubt but that it was an ante-mortem clot.

Microscopic examination of the uterus, tubes, and ovaries, found evidence of former infection with subsequent inflammation.

We have examined 193 papers on this subject and from 125 resembling those reported we have compiled a table of 25 typical cases. From our experience and from the literature of the subject, we conclude: first, sudden death may occur after abortion, labor, or operation, from undemonstrable causes, autopsy finding no adequate reason for the accident.

Second: death may follow abortion, labor, or operation from the rapid formation of a pulmonary embolus. We find that this accident occurs under a variety of circumstances, that it is impossible to designate any one manipulation or stage of labor or abortion, or failure in the mechanism of labor, which can be proved to be the cause. In more than half, labor was normal. The accident happened before delivery. It occurred after the use of forceps, after the performance of version, when difficulty was experienced in delivering the shoulders.

It has been thought that the third stage of labor presents an especially favorable opportunity for the development of sudden pulmonary embolism. We find, however, that the accident happened before the placenta was delivered, and when no effort had been made to deliver it. In one of these cases, the autopsy gave no trace, whatever, of an abnormality causing the accident. Pulmonary embolus also happened after the placenta was delivered by Crede's method.

Pulmonary embolus happened while the patient was sleeping, after normal labor; in a case of polyhydramnios soon after the membranes ruptured, before the patient was delivered; during the first stage of labor, 7 hours after the first pains were noticed; in a case of abortion, in which the ovum was expelled intact. In some cases, hemorrhage had occurred during pregnancy, and in some cases placenta praevia was present.

It is noteworthy, that this accident is not common after Cesarean section: in this operation, done frequently now in obstetric clinics, the uterus is opened outside the abdominal cavity, the placenta is separated manually, uterine sinuses are freely opened in many cases, and the uterus is manipulated to a considerable extent. The more difficult obstetric operations have not predisposed to the occurrence of this accident.

As predisposing and probably exciting causes, we find in a number of these patients that infection of the bronchial tubes during pregnancy, in some with dyspnoea, had been noticed. We must infer that an abnormal condition of the blood predisposes to this accident: in pregnancy, the fibrin in the blood is unusually abundant. In some cases, profound grief during pregnancy had greatly depressed the patient. We find it impossible to ascertain a definite cause for a rapidly forming pulmonary embolus, and recognize preexisting bronchial infections and probable changes in the blood serum as causative factors.

In 16,000 puerperal patients, Richter collected 20 cases of pulmonary embolism; of these, 12 died, and 8 recovered. Mallett in 1800 abdominal sections, collected 6 deaths from pulmonary embolism; 3 after operation for fibroids; 1 after sarcoma of the uterus; 1 after carcinoma of the ovaries; and 1 after cystic ovaries. Fenomenoff in 1,000 abdominal sections, had 4 deaths from pulmonary embolism. In 18,800 women in childbirth or after operation, there occurred 30 cases of immediate pulmonary embolism, of which 22 proved fatal, mortality 73⅓ per cent.

Diagnosis of rapid pulmonary embolism after labor or operation is made from the symptoms; first occurs spasmodic breathing with or without mental disturbance; there is usually no warning, and the patient may wake from sleep to die immediately. Simultaneously with the dyspnoea, the heart acts strongly, the dyspnoea passes, and feeble and shallow respirations follow, the heart continuing to act with considerable vigor. Respiration fails first, the heart-action persisting for several minutes afterward.

It is difficult to outline a prophylactic treatment, when the cause of the accident in not clear. Pulmonary infection of every sort is

dangerous to pregnant women, and to patients about to undergo operation. Conditions of infection or toxaemia, which profoundly alter the blood serum, must also be dangerous. Beyond this, our knowledge at present does not go. In performing obstetric and other operations, we must avoid disturbing the patient as much as possible, and especially must not allow the patient while conscious, to rapidly change her position.

When the accident has declared itself, treatment must be immediate, although with little hope of success. The patient must be kept absolutely quiet, upon the back. Stimulants to promote the action of the heart and respiration, must be given as rapidly as possible. Theoretically, it would seem that the introduction of normal salt solution would be of value. In the case of hysterectomy reported, this was faithfully employed without result. In those cases which have recovered, the patient's convalescence has been slow, and strength has been gained very gradually

Third: patients may die suddenly after labor or operation, at any period within a month, from primary thrombosis and secondary embolism. These cases are not uncommon, Richter collecting 78 in 16,000 parturient patients. Albanus in 1,140 abdominal sections, had 53 cases of thrombosis. Barrows, from Bellevue Hospital, reports 25 deaths after section; 4 from shock; 1 from hemorrhage and secondary shock, and others from thrombosis and embolism. Clark reports 41 cases of femoral thrombosis after gynecological operations.

The causes of this accident are pre-existing infection, mechanical violence, altered conditions in the blood serum and lesions of the walls of the vessels.

The symptoms of thrombosis are obscure in a considerable percentage of cases. Mahler's sign, the "kletterpuls" or the picking pulse, was present in 63 per cent of Richter's cases; in 34 per cent, the symptom was not plain; and in 3 per cent, it was wanting. In the case reported of hysterectomy, this symptom was plainly evident, in the attack, two months before operation, and after the operation. The pulse in these cases rises steadily, while the temperature after operation may rise for a day or two and then fall. The temperature and the pulse curves cross at the third or fourth day, the pulse continuing to rise, while the temperature may be little above normal. The peculiar character of the pulse is best described by the term "picking," referring to the rapid motion of the fingers in one who picks wool or feathers. The pulse does not run, but is rapid and not very strong. If thrombosis is accompanied by infection of an active nature, the temperature will gradually rise. Thrombosis may become evident by palpating the veins beneath the skin, or by vaginal examination.

The treatment of thrombosis after labor or operation, consists in placing the patient at absolute rest, upon her back. Elevation of a swollen thigh, with bandaging, is useful. Forced feeding with moderate stimulation, are often required. The bowels should move daily. Radical treatment of thrombosis may require ligation and excision of the veins of the broad ligaments, and very rarely, the same procedure in veins of the extremities.

Thrombosis has, in itself, not a very high mortality. Fatal cases usually terminate by the formation of pulmonary embolus. In some cases, heart clot precedes pulmonary embolism. Aseptic thrombosis may occur without mortality.

The morbidity of thrombosis is considerable. Richter reports 19 cases of pulmonary complications in 78 cases of thrombosis; 18 of these after labor; and 1 after ovariotomy. Pneumonia of various degrees of severity was the result of thrombosis.

It has frequently been noted that thrombosis is most apt to occur in vessels connected with the left iliac vein. Albanus believes that this is caused by the arterial pressure to which this vein is subjected, and by the fact that it is also pressed upon by the distended bowel.

We have found no cause to accept the theory, that the entrance of air into the veins is sufficient cause of death. The writings of Senn and Hare seem to us conclusive upon this point. It is true that in some cases of thrombosis and embolism, air is found, post-

mortem, in the vessels, but this does not, to us, prove that it has caused death.

Welsh, Nuttall, and Flexner have shown that the bacillus aerogenes capsulatus produces in the vessels the formation of gas, which has been mistaken for atmospheric air. In these cases death occurred in many after uterine injections, during which infection had undoubtedly taken place.

Fourth: among the rare causes of sudden death in parturient women and operative cases, must be mentioned sudden nervous reflex from vaginal manipulation, a patient dying immediately upon vaginal examination from no assignable cause. Walter reports death from rupture of the aorta, 7 days after the birth of twins. Cheron and Jeannin report death from obliteration of one pleural cavity by tubercular pleurisy, with tubercular infection of the opposite lung. Sperling calls attention to infection at the site of the placenta, during labor or during pregnancy, as a cause of thrombosis and embolism. Fenomenoff saw death on the ninth day after abdominal section, from an intestinal ulcer which had opened a blood vessel.

Regarding the mechanism of the formation of pulmonary embolism, this may be preceded by the formation of a heart clot. The length of time required for the formation of a fatal pulmonary embolism varies greatly; in some cases the embolus is sufficiently old to have largely lost its hematin, and becomes yellowish white in color. Such is the color of the clot in the illustration shown. The assertion that such clots are post-mortem or occurred at the moment of death, cannot be proved; while there is abundant evidence that these clots form, as a rule, gradually.

Operators are familiar with the tendency to thrombosis in patients having fibroid tumors. Lesions of the heart and vessels are not infrequent in these cases, and disease of the Fallopian tubes with accumulation of pus is not uncommon. These cases illustrate well the conclusions reached in this paper, namely: that sudden death from thrombosis and embolism is most frequent in cases having foci of infection, or disease of the heart and vessels.

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Case No. and who Reported.	Previous History of Patient.	General Condition at Operation.	Organs Involved for which Operation was Performed.	Nature of Operation. Complications.	Duration.	Kind of Anæsthetic & Amount.	Time of Death. (a) during operation; (b) how long after.	Symptoms of Death.	Treatment. Result.	Autopsy.	Findings or Conclusions.
No. 1. Dr. W. F. Sanford, Am. Jr. Med. Sci., 1870, Vol. LX, n. s., page 277.	Age 34, healthy, 4 para.	Melancholic premonition of death.	Premature.	Normal labor, no hemorrhage.	3 hours 35 minutes.	None.	7½ hours after delivery.	Began one hour after delivery, lividity and *air hunger* and *weak, rapid* pulse: relieved of first attack by use of chloroform to quiet tossing. Another attack 6 hours after delivery fatal.	Stimulation: chloroform, morphia, to quiet tossing.	Autopsy.	Fibrinous clot in right ventricle and filling pul. artery.
Dr. E. P. Hurd, No. 2. Med. Rec., 1882. XXII.	Age 40, good, multipara.	Good.	No hemorrhage.	Normal labor.		None.	Soon after application of binder.	Raised head to vomit; pallor; pulse small rapid, extremities cold.	Whiskey, mouth and skin. Elevation of foot bed.	No autopsy.	
No. 3. Dr. Hurd for Dr. Snow. May 22, 1882. Same paper, Dr. Geo. W. Snow.	Age 45; good; 2 para; first child 1871.	Good.	Labor.	Short forceps.	22 hours.	None mentioned.	19 hours after.	Began sixteen hours; tightness in chest, *rapid* respirations, pulse bad. Eighteen hours breathing labored and jerky; pulse quick and feeble; cyanotic and anxious.	Ginger poultice 16 hours.	No autopsy.	
No. 4. Dr. M. E. Small, Mass. Med. Jr., 1889 Vol. 9, No. 9, page 383.	Mrs. I. Age 45, 8 para.	Some dyspnœa for 3 years; marked past month.	Labor.	Delayed labor, bronchial symp.; no hemorrhage	2 days.	None.	Before placenta emerged.	Some dyspnœa from onset; immediately after child appeared she became livid and gasping for breath; pulse 90 and jerky; died.	None mentioned; sat patient up to relieve dyspnœa.		Necropsy showed no positive cause for death; some congestion both lungs.
No. 5. Dr. M. E. Small. Same paper.	9 para.	Good.	Labor.	Normal.			1 hour afterward.	While sleeping became cyanotic with stertorous breathing and died before awakening.		No autopsy.	Diag. apoplexy.
No. 6. Dr. M. E. Small. Same paper.	6 para at 30 years; 2 misc., 2 children.	Good; had done a small washing day before.	Premature labor; seven months.	Flooding for two days.	48 hours.	None.	Fifth day.	One quarter of an hour after delivery complained of dim vision, fainted, gradually improved; evening second day conscious, paralysis right side; died fifth day.		Autopsy.	Ingravescent hemorrhage.
No. 7. Dr. F. Dunlap, Sect. Obst. & Gyn., Am. Med. Assn., June, 1887.	Good hist. at 24; primipara.	Good.	Labor due Jan. 27, 1887; called Jan. 14, 1887; some bleeding.	Delivered Jan. 15, 1887, 1 P.M.	24 hours.	None.	4 hours after delivery.	Twenty minutes after delivery was fine, then suddenly felt faint; no hemorrhage; some improvement; then dyspnœa and tossing in bed; loss 2nd sound heart.	Head lowered and hypo. brandy; four hours after suddenly sat up and died.	No autopsy.	

Case No. and who Reported.	Previous History of Patient.	General Condition at Operation	Organs Involved for which Operation is Performed.	Nature of Operation. Complications.	Duration.	Kind of Anæsthetic & Amount.	Time of Death. (a) during operation; (b) how long after.	Symptoms of death.	Treatment. Result.	Autopsy.	Findings or Conclusions.
No. 8. Kemansky, of Budapest. Quoted by Lusk. Noted in same paper.	4 para., excessive amniotic fluid; age 36 years.	Not seen before entering hospital.	Labor.	Entered hospital 10 A. M., delivered 3 P. M.		None.	Few minutes after delivery.	Lying on left side and bag of waters protruding, ruptured spontaneously, and discharged 2 gal. fluid, 5 minutes later she gasped, became livid, and died.	Forceps applied.	Autopsy 24 hours later.	Dark brown blood mixed with air in uterine sinuses, vena cava, heart and pul. artery.
No. 9. Dr. Mary P. Jacobi reported a case similar to No. 7 to the New York Pathological Society, and exhibited the heart and clot, which she maintained was post-mortem. Noted in same paper Dr. Dunlop's.											
No. 10. Dr. I. N. Rosenthal, Ft. Wayne, Ind. Discussion of same paper.	Multipara.	Good, somewhat excited.	Labor.	The notes may mean twins; no hemorrhage version.	8 hours.	None noted.	1 hour after delivery.	Within ½ hour after delivery pulse grew weak; sensation of fainting, no sign of hemorrhage, rapidly weaker and died.		No autopsy.	
No. 11. Dr. H. W. Mather, Louisville, Ky. Discussion of same paper.	Illegitimate, primipara; wanted to die.		Labor. Some hemorrhage	Post partum.			1 hour after delivery.	Five minutes after placenta emerged, some relaxation and hemorrhage. In ½ hour after hemorrhage stopped pulse shot up, and gasping for air died within 1 hour.	Hand inserted and uterus grasped, hypo. ergot injec. tr. chlor. ir. controlled hemor'hge.	No autopsy.	
No. 12. Dr. L. H. Hardy, Page, Tex. Daniel's Texas Med. Journal, Austin, Tex., 1890, XI, page 197.	Primipara.	Good health.	Labor.	Preparing for forceps delivery.	2 hours.	Slight chloroform.	Before delivery.	While preparing for forceps, chloroform started, she had not lost consciousness: sneezed; intense dyspnœa, gasping and struggling, and cyanosed while conscious; dead in 15 minutes.	8 grs. quinine to aid contractions before symptoms, hypodermic.	No autopsy.	
No. 13. James Dunlop, M. B. C. M., Glasgow. British Med. Journal, London, 1894, Vol. 1, page 965.	3 para.; previous labors easy, rheumatic fever when a girl; mitral stenosis resulting but not suspected until 5 mos. ago, when she suffered from acute bronchitis and hemoptysis, some edema at latter end of preg., and had been in bed 1 wk.; no bronchitis then.		Normal, but seven 4th facial presentation. S. C.	No post partum hemorrhage.	Slow.	None.	Before placenta was expelled.	Rested after child was expelled and commented on the difficult labor; suddenly coughed, threw back head, and died in 2 minutes. Heart beat ½ minute after beginning of attack.	Ether and other stimulation hypodermically	No autopsy.	

Case No. and who Reported.	Previous History of Patient.	General Condition at Operation.	Organs Involved for which Operation is Performed.	Nature of Operation. Complications.	Duration.	Kind of Anæsthetic & Amount.	Time of Death. (a) during operation; (b) how long after.	Symptoms of Death.	Treatment. Result.	Autopsy.	Findings or Conclusions.
No. 14. W. P. Hogue, M D. Charleston, W. Va., June 7, 1893. Med. Soc. of W. Va., 26th Ses. at Parkersburg.	7 para. Fleshy woman.	Asthmatic breathing during latter month.	Labor.	Large child; head presentation; difficulty with shoulders.		None.	Before child extracted.	Head came out, but unable to get shoulders: allowed patient to kneel at bedside 15 minutes while sending for assistance. She suddenly fell over dead.	No hemorrhage.	No autopsy.	
No. 15. W. McD. Ellis, M. R. C. S. & C. London Lancet, 1888, vol. 2, p. 864.	Mrs. T. at 20; primipara; delivered by midwife.		Labor.	No note of hemorrhage.		None.	Before placenta expelled; within 1–2 hours.	Was allowed to sit up in bed before placenta was expelled. Suddenly gave gasp and fell dead.		Autopsy.	Absolutely negative, left ventricle empty, no thrombi found.
No. 16. Dr. R. Farries, N. Y. N. Y. Med. Rec., June 7, 1884.	Mrs. C. 35 years, 4 para.	Good health, not exhausted.	Labor; hand presenting.	Version, no hemorrhage.	10 min.	No chloroform.	5 minutes after birth.	Version easy, left patient cheerful and went to next room while physician expressed placenta, called in 5 minutes and saw her die as he entered.	Uterus contracted well; no hemorrhage.	No autopsy	
No. 17. Dr. R. Farries; same as above.	Mrs. H., 38 years, short, fat, primipara.	Had been in labor 10 hours, and when he saw her was under chloroform; condition good.	Head presentation, elevated sacral promontory, forceps had repeatedly slipped.	Version difficult.	½ hour.	Chloroform.	¾ hour after delivery.	Placenta delivered and uterus contracted; patient revived, asked few questions, then without warning collapsed and died.	No hemorrhage.	No autopsy.	He says: What did these women die of?
No. 18. Dr. J. W. O'Bryen. Edinburgh Med. Journal n. s. 3–1898, iii p. 180.	Mrs. M., age 28; 2 para; no serious illness, had "hysteria."	Good.	Normal labor.			None.	7 hours from time of first pains.	Labor began 4 a. m., sent for 10 a. m., found cervix partly dilated; left to be called at 11 a. m.; she died, being still in first stage.	He did not see her die.	No autopsy.	
No. 19. Dr. W. T. Lusk, N. Y. Jour. Amer. Med. Asso. Oct. 1884–427, read before Sect. Obst. Amer. Med. Asso., May, 1884.	Primipara; age 23 years.	Excellent health and happy at anticipated maternity.	Normal but tedious labor; patient insisted on bearing child herself and kept on her feet until she was exhausted.	Forceps because of ante-partum concealed hemorrhage and a consequent hemorrhage.	In labor 24 hours.	Chloroform.	Suddenly at 2 hours after delivery.	Compelled to push head back to get bag of waters to dilate cervix; at the end of 24 hours the color suddenly left her face and pulse weaker; forceps applied, hemorrhage controlled; she reacted and spoke; thirsty, and suddenly turning in bed at a time 2 hours after delivery, died.	Heat, hot douche and brandy.	No autopsy.	

Case No. and who Reported.	Previous History of Patient.	General Condition at Operation.	Organs Involved for which Operation is Performed.	Nature of Operation. Performed.	Duration.	Kind of Anæsthetic & Amount.	Time of Death. (a) during operation; (b) how long after.	Symptoms of Death.	Treatment. Result.	Autopsy.	Findings or Conclusions.
No. 20. St. George Hosp. Rep., Vol. vi. See J. A. M. Asso. Oct. 1884 abs.			Precipitate labor standing.			None.	Instantly.	She requested to stand; expelled child and placenta; felt faint and died.		Autopsy.	Air found in uterine sinuses.
No. 21. D. S. Fairchild. M. D., Ames, Ia. Iowa State Medical Reporter, Oct. 1883, p. 49.	Mrs. B., primipara below medium height, full habit, perfectly developed.		Normal but rapid.	Forceps to bring head to perineum.	20 minutes.	Chloroform to allay severe contractions.	Began ½ hour after birth, rallied, and after repeated attacks died 7 hours after delivery.	Chloroform removed as child appeared, placenta normal; she was conscious and professed to feel good; ½ hour later complained of great faintness; pale, no hemorrhage, revived and again another attack, repeated till death.	Stimulation, hot uterine douche, excessive stimulation.	No autopsy.	
No. 22. W. S. Playfair, M. D., Ass. Obstet. to Kings County Hosp. British Med. Jour. Mar. 27, 1869.	Age 21 years, 3 para, 6 months advanced, fissure rectum previously.	Fissure return came in for, and 2 days after operation labor begins.	Abortion, fœtus and membranes intact.	No hemorrhage.		None.	Immediately after expelling fœtus.	After repeated attempts at abortion she finally expels the entire uterine contents intact, becomes extremely dyspnœic, pulseless, and died within 1 hour.	Stimulation, no signs of hemorrhage.	Autopsy.	Right-sided heart clot, probably post-mortem, dark, but an ante-mortem clot in pulmonary artery, especially left side.
No. 23. Dr. J. G. Clark, Philadelphia. Jour. Am. Med. Asso., Jan. 30, 1904. Paper on Peritoneal Saline Infusion in Abdominal Operations.			Cancer of cervix.	Pan-hysterectomy.			Within 24 hours.				Pulmonary embolism.
No. 24. W. C. Wood. M. D., Gloversville, N. Y. N. Y. & Phila. Med. J. Sept. 10, 1904.	Italian, 30 years, some history of cough and difficult breathing before operation.	In labor several hours, cervix partly dilated, a large fibroid filling pelvis.	Large cheesy fibroid on anterior wall of pregnant uterus.	Porro operation.		Ether.	End of 52 hours, did well for 24 hours.	At end of 24 hours developed rapid shallow breathing and rapid pulse. No air entering left lung, temp. 99.6 F., suppressed cough.		No autopsy.	Pulmonary embolism.

CASES REPORTED IN MEDICAL RECORD, JANUARY 14, 1905—SERIES CONSISTS OF SEVENTEEN CASES; THESE THREE ARE THE MOST DEFINITE AND AUTHENTIC.

Case No. and who Reported.	Previous History of Patient.	General Condition at Operation.	Organs Involved for which Operation is Performed.	Nature of Operation. Complications.	Duration.	Kind of Anæsthetic & Amount.	Time of Death. (a) during operation; (b) how long after.	Symptoms of Death.	Treatment. Result.	Autopsy.	Findings or Conclusions.
Byron Robinson, M. D. Dr. Wm. Reese, Dodgeville, Wis.	Not given.	48-hour strangulated hernia.		Herniotomy, not severe.	Not given.	Not noted.	5 hours after operation.	Patient left table in good condition; five hours after operation pulse 80, when suddenly patient rolled and struggled violently, pulse rapid and irregular, and died in two minutes.		No autopsy.	He suggests embolus in cardiac center.
B. Robinson, M. D.	Not given.	Recovering, 17 days after vaginal hysterectomy.	Vaginal hysterectomy; testing for sciatica.	Thrombus of ovarian vein.			17 days after vaginal operation, in 47 minutes after the leg flexing.	He flexed thigh on abdomen and leg on thigh and suddenly extended producing no pain. In three minutes she was cyanosed and gasping for breath, and died in forty-seven minutes.		Autopsy.	Thrombophlebitis left ovarian vein causing shower of pulmonary emboli and obstruction of pulmonary artery.
B. Robinson. Dr. Lucy Waite.	Not given; had several chills during week preceding operation.	Seemingly beginning infection from abortion.	Uterus.	Dilatation, no need of curetting.		Anæsthetic not given.	Few days, but suddenly when she did.	Several chills week prior to dilatation; several in the few days subsequent, a severe one and died.	No sign of abortion or retained membranes, so no curettment.	Autopsy.	Embolism of pulmonary artery; old thrombo-phlebitis of left ovarian vein.

PERNICIOUS VOMITING OF PREGNANCY[1]

By J. WHITRIDGE WILLIAMS
Professor of Obstetrics, Johns Hopkins University

MY attention was particularly directed to the nature of the pernicious vomiting of pregnancy in May, 1903, when I lost a patient at the third month, four days after the induction of abortion, which was undertaken with a pulse of eighty and appeared to give every promise of a satisfactory outcome. Immediately after the operation the vomiting ceased and the patient was perfectly comfortable for eighteen hours, after which she began to vomit again, and soon was almost incessantly expelling small quantities of a brownish coffee-ground-like material, without apparent effort. She rapidly passed into a torpid condition and was absolutely unconscious for the last twelve hours of life.

At the autopsy, which I was fortunate enough to obtain, we were surprised to find in the liver and kidneys the lesions characteristic of acute yellow atrophy of the liver.

This case made a deep impression upon me, as the patient appeared to die from an acute intoxication rather than from inanition, as is usually stated. While firmly convinced of the toxæmic nature of the condition, I must confess that for a time I overlooked the relation which it might bear to the hepatic lesion, and at first sought to account for the production of the latter by some of the more usual explanations, and, finding none, was inclined to regard it as an accidental complication.

I soon had occasion to change my opinion, as in the following twelve months I saw in consultation five other cases of pernicious vomiting, in all of which I felt obliged to terminate pregnancy. Two of these cases died — one at the third month, identically as the one just described, and the other at the seventh month, with the jaundice and diminution in the size of the liver characteristic of acute yellow atrophy — thus giving a mortality of fifty per cent for the six cases.

Unfortunately, all of these cases were seen in consultation practice, and autopsy was permitted only in the case above mentioned, and it was possible to make accurate metabolic observations in but two others.

The results obtained, however, were so striking, as to place the nature of the condition in an entirely new aspect, and to force me to conclude that some cases at least of pernicious vomiting of pregnancy are undoubtedly toxæmic in nature, and are associated with serious lesions of the liver and characteristic changes in metabolism.

Since then I have carefully studied a number of other cases, and wish on this occasion to direct your attention to the general conclusions which I have drawn from my experience, and will refer you to the extended article in the transactions for the full evidence upon which they are based.

Excluding all cases in which the vomiting results from lesions outside of the generative tract, and having no essential connection with pregnancy, and which should be regarded merely as accidental complications, I consider that the evidence at present available justifies us in dividing the cases of serious vomiting of pregnancy into the following groups:

I. Reflex.
II. Neurotic.
III. Toxæmic.

I. Reflex vomiting of pregnancy. This variety of vomiting may be due to the presence of abnormalities of the generative tract or ovum, which existed prior to the onset of pregnancy, or are co-incident with it. Among such conditions may be mentioned:

(*a*) Displacements of the uterus, particularly retroflexions.

(*b*) Ovarian tumors.

(*c*) Certain cases of endometritis.

(*d*) Abnormalities of the ovum, such as hydatidiform mole, hydramnios and certain cases of twin pregnancy.

The occasional causal relation of the first two factors may be demonstrated by the prompt

[1] Author's abstract read before the American Gynecological Society, May 26, 1905. A full report can be found in the Bulletin of Johns Hopkins Hospital.

cessation of the vomiting following the replacement of the uterus or the removal of the ovarian cyst.

The efficiency of endometritis as an etiological factor is not so clear, although in rare instances the findings at autopsy, or upon the examination of the fœtal membranes, afford presumptive evidence that it may be so considered.

The several abnormalities of the ovum mentioned above can readily bring about acute overdistention of the uterus, which in turn may cause reflex vomiting. At the same time, however, such a mode of production should not be considered until accurate examination of the urine has demonstrated the absence of a toxæmia.

On the other hand, the abnormal condition of the cervix, so frequently mentioned in the literature, should not be considered as factors in the causation of reflex vomiting, since it is probable that the occasional cures following their treatment are only striking examples of the curative effect of suggestion.

II. Neurotic vomiting.

Although Anquetin in 1865 directed attention to the neurotic origin of many cases of vomiting and stated that they could frequently be cured by suggestion, it was not until the address of Kaltenbach before the Berlin Obstetrical Society in 1890 that such a mode of origin has been seriously considered. Since then many writers have contended that most, if not all cases of vomiting of pregnancy are neurotic in origin and more or less closely allied to hysteria, and were amenable to suggestive treatment.

I consider that such a view is far too extreme, but I nevertheless believe that it holds good for many cases. For it is only by means of such an hypothesis that one can comprehend the surprising and rapid cures which sometimes so promptly follow the employment of absolutely worthless and unphysiological remedies, as well as the effect of suggestion and the rest cure.

At the same time, this variety of vomiting should be diagnosed only after excluding organic lesions and demonstrating the absence of toxæmia, by a most thorough examination of the urine.

III. Toxæmic vomiting.

As far as I can learn, Fischel in 1884 was the first to suggest the toxæmic nature of the condition, which he attributed, in his case, to the absorption of toxic materials from the impacted large intestine.

Shortly afterwards attention was directed to the occasional occurrence of multiple neuritis in women suffering from severe vomiting of pregnancy, and it was suggested by the earliest writers upon the subject that possibly both conditions were due to the circulation of some toxic material in the blood.

During the past ten years this conception of the vomiting of pregnancy has taken a more and more prominent position, and many attempts have been made to place it upon a secure foundation—all sorts of theories having been advanced concerning the origin and nature of the toxic material—among which may be mentioned—

(*a*) Secretion of corpus luteum.

(*b*) Secretion of ovary.

(*c*) Absorption from intestines.

(*d*) Hepato-toxæmia (Pinard and Bouffe de St. Blaise).

(*e*) Invasion of maternal organism by fœtal elements, the syncytio-toxin theory of Veit, Behm and others.

(*f*) Its indentity with eclampsia on the one hand and acute yellow atrophy on the other—Champetier de Ribes and Bouffe de St. Blaise, Stone, Ewing and Edgar.

That pernicious vomiting stood in some relation to disturbed function of the liver was suggested by the fact that not a few women in the last stages of the disease presented an icteric hue or had marked jaundice. Matthews Duncan, as early as 1879, suggested that some of the fatal cases were really examples of acute yellow atrophy of the liver, but his teachings evoked little interest and were soon forgotten.

Just about the time I observed the case mentioned at the beginning of this article, Stone of New York had a similar experience, and published a description of his case in December, 1903. He took the ground that the vomiting of pregnancy, eclampsia and indeed most of the disturbances of pregnancy, were manifestations of one and the same toxæmia, which

he attributed to a primary disturbance in the hepatic function. Similar views were also enunciated by Ewing of the Cornell Medical College and Edgar within the past year.

I had the opportunity to examine the sections from the liver of Stone's case, and found that they were absolutely identical with those from my own. Accordingly, from my own experience, as well as that of Stone and Ewing, I have no hesitation in saying that in at least a certain proportion of the toxæmic cases of vomiting of pregnancy, characteristic lesions may be found at autopsy, and are identical with those observed in acute yellow atrophy and icterus gravis.

These consist in the degeneration and necrosis of the central portions of the liver lobules, and the fatty degeneration and necrosis of the secretory portions of the kidneys, and can only be explained by the assumption that some powerfully toxic substance is circulating in the blood.

Moreover, in addition to those already mentioned, I have found five other cases in the literature in which acute yellow atrophy was found at autopsy upon patients dying from vomiting of pregnancy, as well as five others in which marked fatty degeneration of the liver was noted.

When one considers the marked disparity of the statements as to the autopsy findings in pernicious vomiting cases in general, and its association with so rare a lesion as yellow atrophy in ten cases, it would seem that it must rest upon something more than a mere accidental co-incidence, and that some direct connection must exist between the two processes.

Of course one may object that the usual clinical history of acute yellow atrophy in pregnant women speaks against such a connection, as it is well known that the majority of cases recorded in the literature occurred in the second half of pregnancy, and usually in the last three months. At the same time, this is not an absolute rule, as a number of cases were observed at the third and fourth months, while Le Masson and Beatty noted the condition at the sixth and eighth weeks respectively.

Moreover, it is more than likely that not a few cases accompanying vomiting in the early months were completely overlooked, as a large part of the autopsies were performed in private houses by persons not particularly skilled in pathological technique, and, while searching for changes in the generative or gastro-intestinal tract, gave but scant attention to lesions in other organs.

Indeed in several of the cases in which yellow atrophy was observed, the authors considered it merely as an accidental condition, and attributed the vomiting to some trifling lesion—such as a cervical catarrh.

It is also possible that the effect of the toxæmia may vary in the different periods of pregnancy, giving rise to vomiting in the early and the characteristic symptoms of acute yellow atrophy in the later months, though I feel that we are probably justified in holding that we have to deal with the same toxic agent in both conditions.

At present we are absolutely ignorant as to the exact nature of the toxic substance or substances concerned, though in the present state of our knowledge it would seem most natural to suppose that they are metabolic in origin and are directly connected with pregnancy—though whether derived from the mother, or fœtus, or both, is not known. All that we can state definitely at this time is that in some cases of pernicious vomiting we have to deal with a toxæmia which gives rise to serious lesions in the liver and later in the kidneys, and that the latter are secondary in character, as is indicated by the fact that the urine does not contain albumin until shortly before death.

Associated with these lesions is a striking change in metabolism, which is manifested by a marked increase in the percentage of nitrogen put out as ammonia compared with the total nitrogen of the urine, so that the former instead of being 3 to 5 per cent, as normal, may rise to 16, 32, or even 46 per cent, as in several of our cases.

Whether this increased ammonia coefficient is due to the fact that the marked destruction of liver tissue interfers with the normal oxidation of nitrogenous material, so that large amounts escape conversion into urea, and are therefore excreted in a less highly oxidized form, as ammonia; or whether it merely

represents an attempt to neutralize an excessive production of acid—a so-called acid intoxication—is as yet undecided. Reasoning by analogy, it is probable that the latter is the case, just as in diabetes, phosphorus poisoning and numerous other conditions. But at the same time it is advisable to avoid hasty conclusions, as it is a question very difficult of determination—as has been found to be the case with the high ammonia coefficient so frequently observed in young children suffering from gastro-enteritis.

However this may be, the practical outcome of my experience is that a marked increase in the ammonia coefficient in women suffering from pernicious vomiting indicates the existence of a serious toxæmia, which if allowed to continue will be found to be accompanied by lesions of the liver and other organs inconsistent with life. Accordingly, under such circumstances, abortion should be induced as soon as the condition is detected, as it offers the only hope of checking the toxæmia, and saving the life of the patient.

My experience has not been sufficiently extended for me to lay down definite rules as to how great an elevation in the ammonia coefficient is consistent with the safe continuance of pregnancy. But until further experience demonstrates the contrary, it would seem safe to assume that an ammonia coefficient of 10 per cent represents the danger signal, and as soon as it is reached, immediate interference is demanded.

On the other hand, in the reflex and neurotic forms of vomiting, the ammonia output remains normal, and accordingly the determination of the ammonia coefficient affords not only a means of diagnosis between the neurotic and toxæmic varieties of vomiting, but is a most valuable guide as to treatment.

Thus, one may have to deal with two women, who are apparently equally seriously sick as far as one can judge from the usual clinical point of view, and may find in the one a high and in the other a normal ammonia coefficient. In the former case my experience has taught me to urge as strongly as possible the termination of pregnancy, and even then to express a guarded prognosis; while in the other I give a favorable prognosis, put the patient to bed and institute a more or less absolute rest cure, and confidently expect her to cease vomiting in two or three days, and to be up and about within a week.

While I agree with Stone and Ewing as to the anatomical lesions found in certain cases of vomiting of pregnancy, I must take sharp issue with them when they contend that the toxæmic vomiting, acute yellow atrophy and eclampsia are manifestations of one and the same toxæmia.

My experience is just the opposite, as it has taught me that there are at least two toxæmias of pregnancy, and probably more—one giving rise to the vomiting of pregnancy and acute yellow atrophy, and the other to eclampsia. This conviction is founded upon careful study of the pathological anatomy, clinical observation and metabolism in these two conditions.

In both necrotic lesions occur in the liver, but differ totally in character in the two diseases, and need to be seen only once to be appreciated.

In eclampsia the lesions begin in the portal spaces and invade the lobule from the periphery toward the centre; while in vomiting of pregnancy the necrosis begins in the centre of the lobule, and spreads peripherally and never involves the portal spaces.

A personal letter from Schmorl, who first recognized the significance and importance of the liver lesion in eclampsia, and who has had the most extended experience in studying this condition, absolutely confirms my contention.

In most cases of eclampsia and pre-eclamptic toxæmia, there are marked signs of involvement of the kidneys and general circulation—as manifested by scanty urine in proportion to the intake of fluid, the early appearance of pronounced albuminuria and the presence of casts and œdema.

In vomiting, on the other hand, the urinary output is diminished only as the intake of fluids is interfered with, and albumin and casts are present only in the last days or hours of life, while œdema is absent.

Chemical examination of the urine shows an equally marked contrast between the two

conditions. In eclampsia the total amount of nitrogen is greatly diminished, while the ammonia coefficient remains practically normal. In vomiting, on the contrary, in spite of the scanty amount of urine, the amount of total nitrogen remains approximately normal, while the ammonia coefficient is wonderfully elevated.

Generally speaking it may be said that a high ammonia output is a favorable prognostic sign in eclampsia, and a very ominous one in vomiting.

CLINICAL TYPES OF PREGNANCY TOXÆMIA[1]

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IN the present paper my attempt is merely to set forth the clinical types of pregnancy toxæmia as I have observed and studied them in my hospital and private practice during the past year or more.

The report is preliminary and imperfect in character, and I am aware that the clinical manifestations in the urine do not always indicate a special toxæmic condition, renal, hepatic, or intestinal. Still, I am of the opinion that all the clinical types of pregnancy toxæmia are closely related, and have possibly a common origin, and the apparently negative urine analyses are due to our present imperfect methods of examination in these cases.

I shall describe seven readily recognizable types, namely:

I. Benign type.
II. Subacute type.
III. Acute type.
IV. Fulminant type.
V. Toxæmic coma without convulsions.
VI. Acid intoxication, simulating hepatic toxæmia of pregnancy.
VII. Cumulative toxæmia.

To these I am adding another type, which I am, at present, unable to classify, namely:

VIII. Persistent hyperemesis without clinical symptoms of toxæmia.

I. BENIGN TOXÆMIA

The benign type comprises the ordinary special petty morbidity of the early months of pregnancy. It is present in many primipara and in a large percentage of all pregnancies. Its most striking feature is its tendency to self-limitation. There is no marked disposition to become worse, and often the reverse is noted up to the time of cessation. Hence it is a slight transitory type of affection.

The symptoms are referred in about equal measure to the gastro-intestinal tract and nervous system. Nausea, vomiting, anorexia, constipation, and perverted tastes appertain to the former, and general nervous irritability, hysterical tendencies, alterations of the mental condition, as exaltation, depression, eccentricity, etc., to the latter. I would enumerate, under benign toxæmia, the chloasma, puritis, etc., which so frequently involves the skin, and which are often in evidence in other toxic states. A study of the urine usually reveals anomalies of metabolism. Various symptoms may be present, which, however disagreeable and atypical they may be, are not necessarily evidences of active toxæmia, as salivation, vertigo, etc.

The chief interest attached to the benign type of toxæmia lies in its possible relationship to the graver forms. Its very great frequency, with its natural tendency to disappear spontaneously before or during the fifth month, causes us to regard it lightly. Even if it does not disappear at this period, it may still be devoid of any bad consequences. Each case, however, must be studied individually. Many factors, insignificant when considered singly, may have a bearing on particular cases. The family and personal history of the woman in regard to biliousness, dysmenorrhœa, and previous pregnancies, the rapidity with which she is bearing her children, her condition after previous deliveries, must all be borne in mind. Even those cases in which a woman feels better in every way when pregnant must not be

[1] Read at the thirtieth annual meeting of the American Gynecological Society, Niagara Falls, May 27, 1903.

too lightly regarded, for this very state of well-being, of euphoria, has, in itself, something abnormal, as may often be verified.

Generally speaking, however, we cannot look upon mild toxæmia of pregnancy as having a serious prognosis. The spontaneous cessation of its symptoms in such a vast majority of cases argues for the existence of a special defensive mechanism in the internal organism. I cannot yet venture to explain why this provision occasionally fails.

II. SUBACUTE TOXÆMIA

In the present connection I am using the term *subacute toxæmia* for the clinical type, which differs from the acute form only in degree. Thus, even so-called yellow atrophy of the liver, which coincides so frequently with acute toxæmia of pregnancy, is by no means always clinically acute. It may be prolonged for weeks, and exceptionally for months.

The pre-eclamptic state, so-called, is an excellent example of subacute toxæmia. While chiefly known as the precursor of eclampsia, a very similar condition has been described under other circumstances, and as a simple clinical phenomenon. These cases may recover under treatment, and possibly spontaneously. They may disappear after delivery. When death occurs, autopsy may be impossible. There is no doubt that cases coming to autopsy will present structural disease of the liver, perhaps of slight degree. Even marked involvement of the organ does not necessarily exclude the possibility of regeneration.

A few years ago severe toxæmia of pregnancy meant only a few well-marked diseases associated with certain viscera—hepatic eclampsia, renal eclampsia, and, perhaps, pernicious vomiting. Now, we find cases of pregnancy toxæmia which corresponds to none of the above classic types. Roughly speaking, they resemble the pre-eclamptic state, especially as it affects the nerve centers. Vomiting, renal insufficiency, mild jaundice, etc., may or may not be present. In many cases recovery occurs, and we have little means of knowing exactly what took place, or whether the organism has sustained some organic lesion. It is to this type of cases that the term subacute or subacute uncomplicated toxæmia is peculiarly adapted.

CASE I. SUBACUTE TOXÆMIA

Mrs. J. H., seen in consultation with Dr. Charles Henry Moak, of New York, in the night of February 14, 1905.

Age 27; primapara; eighth month of gestation; Patient had enjoyed good health during her pregnancy up to within one week of her eclamptic attack, when œdema appeared, and extended up the lower extremities. Persistent headache and gastric disturbances also occurred at this time.

Prior to this time, Dr. Moak tells me, urine analysis was negative, but with the appearance of the headache and gastric disturbances, albumen was found in the urine, with a few hyaline casts.

Mrs. H. was put upon a milk diet, encouraged to drink freely of water, and free catharsis produced.

An improvement in her condition was observed, but upon the afternoon of February 14, 1905, she had five well-marked eclamptic convulsions. I saw the patient in the evening, and found her with some slight rise in temperature and pulse, the latter with considerable tension, and with the exception of some excitement, as the result of the convulsions, in excellent condition. Mentally, she was perfectly clear.

While I was making my examination, Mrs. H. had a typical eclamptic convulsion. I then recommended that the uterus be immediately emptied, but before the kitchen table could be gotten up, and other preparations made for operation two more convulsions occurred, in spite of the use of chloroform, making eight in all. During one of these last convulsions the patient's tongue was severely bitten.

Preparations being complete, I found no attempt at cervical dilatation, the vaginal portion of the cervix being still present.

By means of Bossi's dilator, followed by bimanual dilation, I obtained a full dilatation of the os, and delivered a living child by podalic version and extraction in forty minutes.

No serious lacerations were produced. Before delivering the placenta, and while the patient was still on the operating table, I irri-

gated the colon myself with gallons of decinormal saline solution.

The patient was put to bed, thirty grains of compound jalap powder administered as soon as she could swallow, and the free exhibition of veratrum viride ordered.

Mrs. H. suffered from only one convulsion after the emptying of the uterus, that within an hour of the operation. Repeated colonic washings were continued.

Mrs. H.'s mental condition remained dull and apathetic until noon of the following day, February 15, 1905, when her normal mental condition returned, and she made a rapid and uninterrupted recovery.

The urine analysis in this case was particularly interesting to me, as at no time were there symptoms of marked toxæmia, with the exception of the convulsive attacks, nine in all. In spite of these nine eclamptic convulsions, I look upon such cases as subacute in character by reason of the absence of other toxæmic symptoms.

The urine analysis is from a twenty-four-hour specimen, collected February 15th, and with the exception of the low urea percentage does not give evidence of toxæmia, either of the gastro-intestinal, hepatic, or renal origin. Casts were not present in such number as to indicate marked degenerative changes of the renal parenchyma.

February 17, 1905.
Patient, Mrs. J. H. Report No. 6799.

URINE ANALYSIS

Nature of Specimen, Not stated.
Specific Gravity, 1.016.
Volume, 680 cubic centimeters; 23 fluid ounces.
Reaction, Amphoteric.
Albumin, A small amount is present. Quantity stated below.
Sugar, Absent.
Appearance, Turbid and cloudy.
Color, Reddish.
Ehrlich's Diazo Reaction, Negative.
Bile, Absent.
Indican, Trace.

Quantitative Determinations.	Percentage Grammes in 100 c. c.	Grains in a Fluid Ounce	Grammes.	Amount in Specimen Grains.
Urea	1.34	6.12	9.10	140.8
Chlorides	0.83	3.78	5.64	86.9
Albumin, Small amnt..	0.079	0.36	0.54	8.3

Sugar, Absent.
Leucin and *tyrosin*, Absent.

MICROSCOPICAL EXAMINATION OF THE SEDIMENT

Mucus, Small amount.
Blood, Large amount.
Pus, Moderate amount.
Casts, Small number, hyaline.
Phosphates, Few crystals.
Urates, Absent.
Uric acid, Absent.
Calcium oxalate, Absent.
Epithelia, Moderately large number, bladder and vaginal.
Bacteriological examination not made.

III. ACUTE TOXÆMIA

The acute type I have found a fairly constant clinical type in several respects, although subject to much individual variations. It is constant in its pernicious character, when once established, and in the extreme preponderance of cerebral and nervous symptoms. A prodromal stage may be present, resembling the so-called subacute type in its manifestations. This is important to bear in mind, for then if at any time will treatment promise any salutary results. I have observed cases in which, apparently, there was no prodromal stage. The disease proper usually begins with symptoms of cortical excitation—restlessness, agitation, insomnia, confusion, passing into convultions, maniacal agitation, and delirium. This stage leads inevitably to another, characterized by cortical depression—apathy, hebetude, somnolence, stupor, coma, and perhaps death. In exceptional cases the stage of excitation is but slightly, or not at all, in evidence, the patient passing at once into the terminal manifestations.

Acute toxæmia usually ends fatally in two or three weeks. When it continues much longer —it may exceptionally persist for many weeks— it is none the less fatal, although no longer meriting the title acute.

The earliest cases of acute toxæmia are those instances of acute hepatitis and acute yellow atrophy occurring in the gravida. Nearly all have jaundice. We have since learned that the same clinical course may, and usually does, occur without either jaundice or extensive lesions of the liver. In fact, the small area of the latter has led to the belief that the liver, like other parenchymatous organs, may undergo a functional paralysis without necessary gross tissue changes.

The more acute cases supervening in the midst of health, without prodromes, tend to

show that the liver may suspend its action suddenly. The changes that are present in the liver in such varying degree may only indicate that, after the cessation of its functions, certain areas of the parenchyma are destroyed by autolysis. In any case, the alteration in the liver is not the measure of this disease, and diagnosis and prognosis should not be based upon physical examination of this organ. Normal boundaries, absence of tenderness, etc., should have no weight. The urine is a much more valuable index (presence of leucin), but even this is not infallible. Whenever a woman is taken more or less violently ill without apparent cause, and especially when near the time of her menstrual period, we must always think of the possibility of acute toxæmia of pregnancy. The cortical symptoms, already described, naturally point to this condition. Headache, vomiting, jaundice, general prostration, tenderness over the liver, and certainly the presence of leucin and tyrosin in the urine, strengthen the diagnosis. The patient tends to become worse, yet there is comparatively little tendency to abortion. Cases which linger longer than three weeks evidently represent a milder type of disease.

We must bear in mind that acute toxæmia of pregnancy may be simulated by various affections, as yellow fever, phosphorus poisoning, and acid intoxication of pregnancy (case iv) might lead to confusion.

CASE 2. ACUTE PREGNANCY TOXÆMIA

Mrs. C. G., I saw in consultation with Dr. Q. Feldstein at 8:30 P. M., Christmas eve, December 24, 1904. She was a primipara, twenty-six years of age, and seven and a half months pregnant.

During her pregnancy she had enjoyed good health; and during the afternoon of December 24 had been engaged in her Christmas shopping.

In the evening of this day she suddenly had an eclamptic convulsion, and she had had two when I saw her, and a third occurred during my examination. I advised immediate emptying of the uterus, so a private ambulance was secured, and she was transferred to my service at the Emergency Hospital of Bellevue, and was on the operating table at 9:44 P. M. of the same evening. Mrs. G. here had her fourth convulsion. Four ounces of urine was obtained by catheter for analysis, and under chloroform a rapid manual dilatation of the os was performed, followed by direct podalic version, and the delivery of a living female child, weighing three pounds, six ounces, at 11:05 P. M. The patient was put to bed at 11:20 P. M., and treated with hot packs, colon washing, veratrum viride, large doses of calomel, etc.

Between the hours of one and seven A. M. of Christmas day, this patient had seven convulsions at lengthening intervals, making thus far ten convulsions in twelve hours. After the second convulsion at her home, the intervals were practically conditions of coma, and the patient was apparently blind after the third convulsion. Four more convulsions occurred during Christmas day, making fourteen convulsions in all.

For three days more the patient remained in a comatose condition, and was unable to recognize her husband or family physician until the fifth day post-partum.

After the fifth day, according to her family physician, she returned to her normal condition.

The baby survived for two weeks, and died in convulsions, January 8, 1905.

The first urine analysis, December 25, 1904, showed parenchymatous renal degeneration and renal insufficiency. A trace of acetone was found.

A specimen of urine sent to the Cornell Pathological Laboratory was reported on by Dr. James Ewing, as follows: Quantity, 500 c. c.; bloody; sp. gr., 1.019; reaction, neutral; considerable albumin; indican much increased; many hyaline, epithelial, and granular casts.

Urea (hypobromite method), .642 grms. per 100 c. c. Ammonia, .272 grms. per 100 c. c. In sediment ppt. by lead acetate were many leucin crystals.

Slight jaundice was present in this case, and no apparent physical changes in the liver.

This case I class as one of acute pregnancy toxæmia. The onset was sudden and severe, the pre-eclamptic state being absent, or having escaped the notice of the family physician.

The severity and great number of the con-

vulsions (namely, 14), the prolonged and profound post-partum coma and stupor, the presence of acetone and leucin in the urine, and the marked parenchymatous renal changes, all attest to the acuteness of the toxæmia present.

The patient made fair recovery, and left the hospital January 17, 1905, in an anæmic condition. I have since heard repeatedly from this patient, and her health has been far from satisfactory for the past four months.

December 25, 1904.
Patient, C. G., at Emergency Hospital. Report No. 6424.

URINE ANALYSIS

Nature of Specimen, During eclampsia.
Specific Gravity, 1 032½.
Reaction, Acid (moderately strong).
Albumin, A very large amount is present. Quantity stated below.
Sugar, Absent.
Appearance, Smoky.
Color, Deep amber.
Ehrlich's Diazo Reaction,
Bile, Absent.
Indican, Absent.

Quantitative Determinations.	Percentage Grammes in 100 c. c.	Grains in a Fluid Ounce.
Urea, Much diminished	1.34	6.12
Chlorides, Normal.....	1.12	5.10
Albumin, Very large amount.....	6.20	28.25

Sugar, Absent
Acetone, Trace only.
Diacetic acid, Absent.
Mucus, Small amount.
Blood, Small number much distorted red corpuscles.
Pus, Absent.
Casts, Numerous granular, some containing fat granules. Moderate number hyaline and epithelial.
Phosphates, Absent.
Urates, Absent.
Uric acid, Absent.
Calcium oxalate, Absent.
Epithelia, Moderate number, bladder and renal.
Leucin and *tyrosin,* Absent.
Bacteriological examinations not made.

IV. FULMINANT TOXÆMIA

The term fulminant may be applied to the most intense type of acute toxæmia of pregnancy, or to sudden death occurring from a masked toxæmia. I am referring here to those cases in which the clinical manifestations resemble closely the fulmiant types of acute infectious diseases, in which death may result before a diagnosis can be made. The symptoms consist essentially of sudden intense prostration, including cardiac failure, anomalies of temperature, and early and progressive implication of the cerebral cortex, which leads to early and fatal coma. As these cases may prove fatal in a day, there are but few—often no opportunities for clinical observation, and the autopsy is of the utmost importance. In uncomplicated toxæmia of pregnancy the liver should be found the seat of alterations, although the extreme rapidity with which death supervenes may be due to cardiac collapse, severe meningitis, or some other factor. Exact diagnosis is important in order to exclude the suspicion of poisoning, suicide, etc. In some instances, sudden death in pregnancy is purely a coincidence—for example, when multiple fat necrosis is found at autopsy. Numerous other coincidences will readily suggest themselves. On the other hand, how often, in cases of sudden death, has the fact of pregnancy, especially early pregnancy, been recorded, without the slightest attempt to connect the lesions found with the pregnant state?

Of sudden death in pregnancy or the puerperium with the patient in apparent health, little is known. Ewing and Norris have attributed as paradoxical cardiac failure to the action of pregnancy toxins upon circulatory organs. Cardiac thrombosis, primary pulmonary embolism, and other affections have been placed in this category.

CASE 3. ACUTE FULMINANT TOXÆMIA

K. M.; para, 1; age twenty-five; no miscarriages or abortions; in the ninth month of pregnancy was received as an antepartum case at the Bellevue Emergency Hospital, May 2, 1905. Nothing unusual was noticed about the patient except that she was slightly jaundiced and that she complained somewhat of nausea and vomiting.

The routine urine analysis of the hospital revealed a moderate amount of albumin.

Specific Gravity, 1.013.
Faintly alkaline.
No sugar.
No casts, leucocytes.
Urea, 4½ grains to Oz. 1.

Upon May 5th the jaundice and vomiting increased, the latter now almost persistent. This went on until May 9th, with increasing amount of albumen and more marked jaundice, when it was decided to empty the uterus. This was done upon May 9th, by manual dilatation of

the cervix and podalic version. A living child, jaundiced, was delivered.

The patient stood the operation well, but the nausea, vomiting, and jaundice increased. The liver was found to be sensitive, but not noticeably diminished in size.

Upon May 11, two days following operation, the patient had the only convulsion, and so slight that it would probably have escaped observation had not the nurse been standing by the bed. Stupor approaching coma followed the convulsion, which continued until 3:30 P. M. of May 12th, when the patient died in coma, about nine days after the severe vomiting began.

Laboratory examination of the urine before death revealed a small amount of albumen, no casts, moderate amount of indican, leucin and tyrosin, attested to by Dr. James Ewing, of Cornell Medical College.

A full autopsy was performed, a report of which will be subsequently published. The kidneys were normal, the liver weighed three pounds, and showed acute yellow atrophy.

V. TOXÆMIC COMA WITHOUT CONVULSIONS

The acute toxæmia of pregnancy may pass directly into coma without any preceding stage of excitement. Under such circumstances we commonly find an acute lesion of the liver, or in very rare instances some other acute organic lesion (kidney, meninges). This type of comatose state belongs in reality under acute toxæmia including its fulminant variety.

Of quite a different type is eclampsia without convulsions. This develops late in pregnancy with the classic picture of the pre-eclamptic state, Convulsions do not occur, or may be very slightly present. Instead, we find somnolence, stupor, or actual coma. Some of these cases may be regarded as abortive (perhaps aborted by prophylactic treatment); others are undoubtedly of unusual gravity.

Transition forms occur between these two types of coma. Thus, in clinical eclampsia without pregnancy-kidney, but with marked lesions of the liver, we see a connecting link between acute toxæmia of pregnancy and eclampsia. If, under such circumstances, a well marked pre-eclamptic stage terminated directly in coma the clinical type would be subacute toxæmia.

CASE 4. TOXÆMIC COMA WITHOUT CONVULSIONS.

Mrs. T. was seen by me, in consultation with Dr. Charles A. Mansen, of New York, upon November 14, 1904.

Mrs. T., at this time, was three and a half months pregnant, and was in a semi-comatose condition, which, at first, bore some resemblance to an hysterical condition.

Her pulse was 120, and hard; temperature, 101 F., and respirations slower than normal. Her pupils were moderately contracted, and responded poorly to light; there was moderate œdema of the ankles, no puffiness about the eyes or face, and the area of hepatic dullness normal. Not at this time, nor subsequently, was hepatic tenderness observed.

The present pregnancy was the second. The first was three years previous, and at that time the patient suffered from an acute eclamptic attack at the fifth month, and was delivered by rapid dilatation and extracted after several eclamptic convulsions at the Sloane Maternity. During the present pregnancy, Mrs. T. had suffered from persistent nausea and vomiting, and what was described as an aggravated form of "acid indigestion," from which she could obtain no relief. Not being entirely satisfied with the diagnosis, by reason of the apparent hysterical condition, I advised that free catharsis be produced, and the colon irrigated repeatedly until a urine analysis could be obtained. A specimen of the urine was sent to the laboratory of Dr. E. E. Smith, with the request for an immediate report thereon. This was obtained in a few hours, and was rather a surprise:

Specific Gravity, 1.017.
Reaction, Strongly acid.
Sugar, Absent.
Bile, Absent.
Indican and *albumen*, Absent.
Urea, 1.95 grammes in c. c. 8.87 grains in fluid ounce. Small number granular casts.
Phosphates, urates, uric acid, and *calcium oxalate*, Absent.
Quantitative determinations at this time not made.

I saw the patient again on the evening of the same day, and found the coma more marked and the hysterical manifestations to have entirely disappeared; temperature and pulse the same as in the afternoon.

In view of Mrs. T.'s previous eclamptic history and the deepening of the coma in spite of the catharsis and colon irrigation, I advised the prompt emptying of the uterus, which was performed by rapid cervical dilatation and curettage. The operation was complete within forty minutes, and the colon irrigations continued, and veratrum viride added to the treatment to reduce the frequency and tension of the pulse.

Under this treatment the stupor gradually lessened, so that there was marked improvement in twenty-four hours, but Mrs. T. did not return to what her family considered to be her normal mental condition for nearly one week.

The total amount of urine obtained in the first twenty-four hours following operation, was sent to the laboratory for a more complete analysis.

The report showed a strongly acid urine, albumen, sugar, bile, and indican absent; small granular casts; no phosphates, urates, uric acid, or calcium oxalate; urea increased in amount over the specimen of the preceding day.

Additional quantitative determinations showed acetone, 0.25 grammes in 100 c. c. 1.28 grains in fluid ounce.

Diacetic acid present with a moderately strong reaction. Ammonium salts present in unusual amount. The laboratory comment upon this specimen was as follows:

"The findings in the urine at this time do not give evidence of a gastro-intestinal toxæmia, and do not give very material evidence of renal changes, a small number of granular casts being the only feature pointing to a renal process. The striking feature of the specimen is the evidence of acid intoxication, a large excess of acetone, diacetic acid and an excess of ammonium salts being present. These findings point to the excessive formation and presence of B-oxybutyric acid, producing an acidæmia of a sufficient degree of severity to explain the acid vomiting and even the existence of coma."

A subsequent twenty-four hour specimen of urine was sent to the Cornell Pathological Laboratory and both Ewing and Beebe attested to the above condition, and also to the presence of leucin.

The urine analysis in this case at first pointed to toxæmic coma, due to acid intoxication. A further analysis of a twenty-four hour specimen, however, revealed the presence of leucin in the urine, thus pointing to hepatic toxæmia as the cause of the coma.

We have thus, in this case, an acid toxæmia complicating an hepatic toxæmia.

VI. ACID INTOXICATION SIMULATING HEPATIC TOXÆMIA OF PREGNANCY

The relationship of acid intoxication, as represented by acetonemia to pregnancy, is obscure. Slight so-called physiological acetonuria is very common in pregnancy, and seems to possess no significance. Acid intoxication proper is said to have been recognized in some cases of fatal toxæmia of pregnancy, and since this condition is manifested by coma, and in some cases by convulsions, it has been accused of causing eclampsia.

As acid intoxication occurs under a great variety of conditions—diabetes, cancer, various gastro-intestinal affections, poisoning, etc. —its presence in pregnancy is doubtless secondary to some other condition rather than to the special or hepatic toxæmia.

Acid intoxication in pregnancy had best be regarded as a condition which may simulate the hepatic toxæmia of pregnancy, especially the comatose forms. Differentiation should be made by urinary tests—the presence of the acetone bodies in unusual amounts with the corresponding absence of the positive findings of hepatic toxæmia.

It is, of course, possible that the two conditions may exist side by side (case 4), and even that acetonemia may be in some way due to the other toxic state (for it has been noted in many kinds of poisoning); but thus far the evidence is very vague. The subject of acid intoxication is one which becomes more complex the more we know of it.

Case 4 at first was considered to be one of coma from acid intoxication. More extended urine analysis, however, revealed the presence of hepatic toxæmia as well.

VII. CUMULATIVE TOXÆMIA

It has long been recognized that rapid childbearing has elements of danger for women, and that even constant breeding with two or

three year intervals tends in the course of time to react upon the mother, and to increase her exposure to some of the special perils of child-bearing. It is only very recently, however, that the possibility of a cumulative toxæmia of pregnancy has been considered to account for at least a good share of the risks run by women from rapid or excessive child-bearing.

We can hardly speak of a clinical type of cumulative toxæmia since we are dealing not so much with special symptoms as with the history of the patient, and with her condition between pregnancies. If we find that a woman who has passed safely through the puerperal state after having exhibited some form of hepatic toxæmia during pregnancy, continues to show evidences of hepatic insufficiency, or if some local toxic manifestation (pregnancy-kidney, neuritis, etc.) does not undergo the expected resolution, or respond to treatment; and finally if the blood-count shows persistent alterations pointing to anæmia or leukemia, the prognosis of the case forbids gestation until all such symptoms have disappeared. Generally speaking, however, cumulative toxæmia implies such rapid child-bearing that the woman is seen only when actually pregnant. If we find her suffering from any form of toxæmia which while not necessarily severe in itself is graver in character than that presented in the antecedent pregnancy, or if with each succeeding pregnancies the woman exhibits more and more evidence of hepatic insufficiency, we may suspect the presence of cumulative toxæmia. We must not always expect to see these succeeding pregnancies become worse in a logical or orderly sequence; although this tendency is visible in hyperemesis and eclampsia. On the contrary, two or more pregnancies with relatively mild toxæmia may be followed by a third in which the patient perishes without other warning from the fulminant type of toxæmia. If in addition to the evidence of cumulative toxæmia already stated, we find a family history of "biliousness" (cholemia), with tendency of the woman's nearest female relatives to suffer unduly in pregnancy, or a personal history of dysmennorrhœa with mild toxic symptoms, the least we can do with such a woman is to place her in a special class, for which rapid child-bearing is extra hazardous, and pregnancy under any circumstances not to be lightly undertaken.

VIII. PERSISTENT HYPEREMESIS WITHOUT CLINICAL SYMPTOMS OF TOXÆMIA: PSEUDO-TOXÆMIA

I occasionally see cases in which hyperemesis does not cease before the eighth month, but continues despite all treatment until near delivery. In this type of cases the vomiting does not become pernicious in character, but its persistence causes much apprehension in the minds of all concerned. My belief is that these gravidæ have suffered early in pregnancy from slight, transitory, so-called benign toxæmia, but if we examine them carefully in the latter months nothing suggesting toxæmia can be elicited. The urine is free from evidence of disturbed metabolism, and there is nothing which points to renal insufficiency. The mental state is normal, as is also the nervous system, save for the exalted reflex excitability which may be supposed to underlie the tendency to vomit. The fetus does not appear to present any anomalies. We may find that these women have vomited throughout all their pregnancies (as in case 5). It is perhaps hardly just to associate these cases with actual toxæmia of pregnancy, save in connection with differential diagnosis, which is of the utmost importance. But, bearing in mind the rudimentary character of our present knowledge of the toxæmic states of pregnancy, we must watch these cases carefully, even although the clinical picture of a toxæmia is not in evidence. We must watch them not only through labor, but into the puerperium. If a toxic state, latent in its other manifestations, is behind the hyperemesis, it may assert itself in some form after delivery.

As already stated, vomiting in these cases should subside after delivery. It is unnecessary to speculate here on the nature of this clinical type, and wherein it differs from other types. Its chief bearing lies in prognosis. We must not err on either side. The prognosis, once the type is recognized, is good; but not so good as to exclude special watchfulness through the puerperium.

CASE 5. PERSISTENT HYPEREMESIS WITHOUT CLINICAL SYMPTOMS OF TOXÆMIA

Mrs. L. was referred to me for her confinement by Dr. Charles Gilmore Kerley. Case first seen by me in December, 1904, and was confined at full term of a healthy living child in the latter part of March, 1905. Patient had had four miscarriages, and has seven living children.

In every pregnancy, without exception, beginning in the first month, this patient has persistent daily nausea and vomiting from arising in the morning until noon.

This condition continues until three or four weeks before delivery. At no time has there been any jaundice, and the patient has considered herself always healthy, looking upon the nausea and vomiting as a necessary accompaniment of pregnancy.

In the first pregnancy Mrs. L.'s condition became alarming by reason of the persistent vomiting, and she was kept in bed for the second, third, and fourth months of this pregnancy. She was in another city at this time, and was seen by several consultants with the view to emptying her uterus to stop the vomiting.

This case was of great interest to me and I watched her carefully for clinical symptoms of toxæmia without being able at any time to detect any.

Her mental condition was at all times normal and satisfactory, and repeated unrinary examinations by an expert failed to show evidences of toxæmia, although moderate amounts of indican were at times found. We were never able to detect any leucin and tyrosin in the urine. I append a urine analysis made February 17, 1905, one month before confinement; which is typical of all the examinations of the urine.

This patient was last seen by me May 15, 1905, when her physical and mental condition appeared of the best, she had gained in weight since her confinement, and she stated that she never enjoyed better health.

LABORATORY

February 17, 1905.
Patient, Mrs. L. Report No. 6800.

URINE ANALYSIS

Nature of Specimen, Not stated.
Specific gravity, 1.020.
Reaction, Slightly acid.
Albumin, None found tests for traces obscured by the persistent turbidity
Sugar, Absent.
Apperance, Turbid.
Color, Normal amber.
Ehrlich's Diazo Reaction, Negative
Bile, Absent.
Indican, Moderate amount.

Quantitative Determinations.	Percentage Grammes in 100 c. c.	Grains in a Fluid Ounce
Urea	1.21	5.50
Chlorides	0.89	4.06
Albumin		

Sugar, Absent.

MICROSCOPICAL EXAMINATION OF THE SEDIMENT

Mucus, Small amount.
Blood, Absent.
Pus, Absent.
Casts, Absent.
Phosphates, Absent.
Urates, Absent.
Uric acid, Absent.
Calcium oxalate, Absent.
Epithelia, Moderate number bladder and vaginal.
Bacteriological examination not made.

50 East 34th Street, New York City.

APPENDICITIS COMPLICATING PREGNANCY[1]

BY HENRY C. COE, M.D., OF NEW YORK

CONSIDERING the importance of this subject, I have been surprised to find how little attention has been bestowed upon it by recent writers on obstetrics. Edgar, in his voluminous work, makes only a passing reference to it; Williams has a brief paragraph; Hirsh a few lines. Dorland is the only American author who seems to regard it as worthy of an extended notice. Kelly, in his recent monograph on the appendix, emphasizes the importance of appendicitis as a complication of pregnancy by devoting an entire chapter to it. Frequent references appear in current medical literature, both Foreign and

[1] Read at a meeting of the American Gynecological Society, May 26, 1905.

American, but there is a curious uniformity in them, which seems to suggest that there is not much opportunity for originality in discussing this topic. A paper by Abrahams (*Am. Jour. Obstetrics*, vol. xxv, 1897) is often quoted. The latter refers to a brief article by Mundé in the *New York Medical Record*, (December 1, 1894), who is credited with having been the first to call attention to the subject. But, in reviewing the history of his case, it appears by no means certain that it was one of appendicitis. The patient had a temperature of 104° Fahrenheit during labor, with pain in the right iliac region, was delivered of a dead fetus, and had persistent high fever, with local pain, and the development of an induration above Poupart's ligament, where an abscess was incised on the sixth day after delivery.

There is no evidence that the time origin of the inflammation was discovered, hence, it would seem to be unscientific to quote this as the first recorded case of appendicitis complicating pregnancy, especially as Hancock reported in 1848 a case of what was then called perityphletic abscess, which he incised and drained.

Some confusion has arisen from the failure of writers to distinguish between the mild catarrhal and the perforative variety of the disease, which accounts for the different views which prevail as to the frequency and prognosis of the condition during pregnancy. My own experience leads me to concur with Kelly's opinion that many mild cases occurring during pregnancy are overlooked, while more serious ones developing after delivery are erroneously referred to puerperal sepsis.

Fraenkel (*Samuel Klin Vorträge*, 1898, No. 229) believes that "the appendix during pregnancy is subject to no different conditions than at other times." However, he admits that the obstinate constipation, so common in pregnant women, must favor fresh attacks in recurrent cases. I believe, with Diculefoy, that since there is a greater tendency to intestinal toxæmia during pregnancy, there is every reason to expect appendiceal complications. Attention was called by Cragin at the last meeting of this Society to the relative freqency of pyelitis of intestinal origin.

When we remember that many women with a history of former appendiceal inflammation (with or without accompanying adnexal disease) become pregnant, it is a matter for surprise to meet with the common statement that this is a rare complication. Pinard (*La Semaine Medicale*, May 7, 1898) collected forty-five cases, in thirty of which the diagnosis was confirmed by operation or autopsy, and many cases have since been reported by American and Foreign observers.

Although I shall confine myself to the topic of appendicitis complicating pregnancy, it is evident that a sharp line cannot be drawn between this condition in the pregnant and puerperal woman, since a latent inflammation may become active soon after delivery, or even during the course of labor.

The majority of the cases observed during pregnancy are fortunately of the mild type, as illustrated in the following: I have now under observation a primipara in the seventh month who two months ago, after a late supper including caviare, cheese, salad, and other indigestibles, was seized with a sharp pain over the appendiceal region, with vomiting, tympanites, and local tenderness, her rectal temperature being a little above 100° Fahrenheit. The acute symptoms subsided quickly under the use of laxatives, high enemata and fluid diet, with rest in bed and an ice-bag; but local tenderness and muscular resistance persisted for several days. The uterus seemed to be deviated towards the right, so that I suspected the presence of slight adhesions, and shall feel more or less anxiety about the patient, although she has not had another attack since. Three other patients, seen in consultation, presented similar symptoms, but recovered without surgical intervention, and went to full term. Engström reports eighteen of these mild cases in which recovery occurred without operation, or interrupting the pregnancy. The criticism may be raised that the condition was a simple colitis, but it seemed to me that the symptoms were too severe and the pain too clearly localized to admit of much doubt as to the diagnosis.

Mrs. W., æt. thirty-five, I have attended three times in confinement. She had a history of recurrent attacks of appendiceal colic, and during each pregnancy had at intervals local pain and soreness, without fever, which yielded

to medicinal treatment. The puerperium was always afebrile, but the patient's discomfort finally became so constant, that a few months after the birth of her last child she consented to an operation, and I removed a thickened, ahderent appendix, at the same time repairing her lacerated cervix and pelvic flow, and suspending the retroverted uterus.

Mrs. H., æt. twenty-five, had an obscure history of appendiceal inflammation and occasional attacks of pain during pregnancy. I was obliged to induce labor at eight and one-half months on account of threatening uræmic symptoms, the delivery being instrumental and difficult. The puerperium was normal, and the patient had no evidence of local trouble until a year later, when she had an acute attack requiring immediate operation. Three years later she had a second easy confinement. A primipara, æt. twenty-four, whom I saw in consultation when in the fifth month had an acute attack (her first) with the typical symptoms of appendicitis — local pain, rigidity, and elevation of temperature. I advised her removal to a hospital for operation, but strong objections were raised, so that she was treated medically and recovered, but miscarried a few days later. As she passed from under my observation I cannot state whether she had a return of the trouble or not.

Two young primiparæ, in the fourth month of pregnancy, were under my care in the Memorial Hospital, with mild attacks of appendicitis. In one, the acute symptoms subsided in the course of a week, and I decided not to operate. She went to full term, had a normal delivery, and so far as I know has not had another attack. In the other, I removed a thickened appendix without interrupting the pregnancy.

Mrs. S., æt. nineteen, a primipara at the beginning of the fifth month, had a sudden attack of abdominal pain, with vomiting and elevation of temperature to 101° Fahrenheit tympanites. The pain became localized over the appendix, and the characteristic muscular rigidity was marked. Within three or four days a deep-seated induration could be felt, which in bimanual examination seemed to be pressed with the right horn of the uterus. There was no history of previous pelvic or appendiceal trouble. After some delay and repeated consultations, Dr. McBurney decided to operate. A suppurating appendix was removed from a bed of adhesions, which were firmly attached to the uterus. A cigarette drain was used. The patient had an afebrile convalesence, the exudate entirely disappeared, and she went on to the eighth month, when she was delivered prematurely of twins (both of which lived). Twenty-four hours after the labor she had several eclamptic seizures, and was in great danger for a week, but made a good recovery and has remained perfectly well for three years. A year later, when I had occasion to perform a minor operation upon her, I found the uterus quite movable, without any trace of adhesions, the abdominal cicatrix being firm. I may add in this connection that I have never seen a case of hernia or local irritation following labor in these cases.

In a case which I saw in consultation with Dr. Marx, the patient had her initial attack during the eighth month, with typical symptoms of perforation. On account of the size of the uterus, palpation gave a negative result. We decided, nevertheless, to make a lateral incision, and opened a large abscess, the inner wall of which was formed by the pregnant uterus. A sloughing appendix was removed. An unfavorable prognosis was given, as the patient was profoundly septic, but she was delivered of a living child the next day, and eventually recovered.

In the case of a multipara, æt. thirty-five, seen in consultation when four mounths pregnant, the uterus was fixed by exudate, which filled the cul de sac and extended nearly to the umbilicus. She had a high pulse-rate and temperature, but no evidence of general sepsis. I made an explorative abdominal incision, but could not reach the abscess without extensive dissection and handling of the uterus, which I wished to avoid. The incision was closed, and I succeeded in entering and draining the abscess per vaginam. A doubtful prognosis was given, but the patient did not miscarry until two weeks later and made a good recovery. The origin of the inflammation in this instance was not clear, but I suspected that it was appendicular in view of the acute onset, and absence of a history of previous adnexal disease.

As to the relative frequency of *first* attacks of appendicitis in pregnancy I am inclined to agree with Frænkel that they are no more common than in the non-pregnant — probably less so, since the common etiological factor (diseased adnexa) is apt to be associated with sterility. On the other hand, the frequent constipation and intestinal toxæmia of pregnancy is naturally an exciting cause of fresh attacks in recurrent cases. The vento-perforative type is not so common as would be inferred from a review of the more pessimistic articles on the subject, such as the one by Abrahams, already quoted. The diagnosis should present no especial difficulties during the first half of pregnancy, especially if there is a history of previous attacks, and an absence of disease of the tubes or ovaries. The gastro-intestinal disturbances, unilateral muscular rigidity, with or without marked elevating temperature and acceleration of the pulse, would point to the probable condition, even though the result of the physical examination is negative. After the fifth month the gravid uterus may prevent one from mapping out an exudate around the diseased appendix, but here again the local pain and tenderness would give a clew to the trouble. Frænkel (loc. ut.) recommends placing the patient on her left side so that the uterus will be displaced in that direction, and push the mass against the examining fingers. In the fulminant cases, as Gerster rightly observes, there is practically no other source for such a rapid and intense septic infection during pregnancy, except perforation of the appendix. It would certainly be rare for an acute salpingitis or oöphoritis to develop at this time, though I have reported two cases of the latter terminating in abscess formation after normal delivery at term, both patients recovering, one after operation and the other with expectant treatment.

Among the conditions which may be mistaken for appendicitis complicating pregnancy is ruptured ectopic, especially the interstitial variety that has advanced to the third or fourth month; but the history would throw light on the condition, while the amount of shock and evidences of internal hemorrhage, the absence of temperature (unless after reaction occurs), and the results of the pelvic examination would assist in the diagnosis. I have made no reference to the value of a leucocyte count, first because leucocytosis may be present in normal pregnancy, and secondly there may be an increase in the number of white cells at the time of rupture, which would be quite misleading. The bearing of leucocytosis upon the diagnosis of appendicitis has already been thoroughly discussed by hæmatologists. A few days ago I had occasion to open the abdomen for intraperitoneal rupture of an ectopic sac, and found the appendix acutely inflamed. Attachment of the diseased organ to an old sac is a fact of common observation.

Allusion has been made to the comparative infrequency of acute adnexal disease during pregnancy. It does occur, and when the tumor is above the pelvic brim on the right side, a differential diagnosis may be practically impossible. Such a complication is, however, more apt to arise during the puerperium.

Torsion of the pedicle of a small ovarian cyst, or hydrosalpinx, during pregnancy may give rise to symptoms which closely simulate perforative appendicitis, since localized peritonitis rapidly develops and there may be tenderness and muscular rigidity, though the latter is not apt to be unilateral. But there is not the same history of intestinal disturbance, and the circumscribed mass can be mapped out by the bimanual. I have notes of two such cases, operated upon successfully during the fifth month of pregnancy, both patients going to term and having normal labors.

Cragin, at the last meeting of the Society, called attention to the relative frequency of acute pyelitis, now generally thought to be due to the colon-bacillus, and I would note the importance of distinguishing this condition from appendicitis, before the pain becomes localized over the kidney. In an interesting case recently under my observation the diagnosis remained in doubt for several days, on account of the prominence of the intestinal symptoms (colitis and tympanites), the localization of the pain in the right lower abdomen, and the fact that pus did not appear in the urine during the first week. The temperature in this form of pyelitis may be curiously out of proportion to the pathological condition.

Doubtless many cases of impacted feces and colitis in pregnant women are mistaken for catarrhal appendicitis, but thorough evacuation of the bowels and careful observation should clear up the diagnosis. A recent experience in which I operated upon a pregnant woman for recurrent appendicitis, when it has turned out that she had a perforating ulcer, has impressed upon me the importance of keeping doubtful cases under one's eye for a few days before operation, unless the symptoms are urgent.

Two patients with typhoid, whom I conducted through pregnancy to normal delivery and convalescence, had, indeed, localized pain, fever, etc., which at first rendered the diagnosis obscure; but the cases were later so typical that no doubt could be entertained. Yet, on the other hand I have been called upon to incise a huge appendicular abscess after the patient had been treated six weeks (!) for typhoid.

If I may be allowed a slight digression, I would like to refer briefly to the diagnosis of appendicitis occurring during the puerperium. An acute attack occurring within the first week may be exceedingly difficult to differentiate from puerperal sepsis, unless there has been a history of appendicular trouble late in the pregnancy. During the second week there would be less doubt. However, there are so many instances of puerperal elevation of temperature of obscure origin, that even after the most careful examination of the pelvis and abdomen, one may refer to pelvic thrombosis, or some other ill-defined pathological condition, symptoms that are really due to an inflamed appendix. An appendiceal complication should always be suspected in the case of puerperal abscesses which are situated high above the pelvic brim, or (as in one instance) in the right loin. But as this part of the subject does not belong to this discussion, I omit any reference to several interesting cases which I might cite to support this contention. The conclusion of Abrahams with regard to the prognosis of appendicitis complicating pregnancy are rather gloomy, but we must remember that most of the cases cited by him were of the suppurative variety. He states that in these, 70 per cent of the mothers died, but adds that even in the simple catarrhal type 47 per cent succumbed, while only one child survived out of his collection. This does not agree with the statistics of later writers. My own experience has been similar to that of Gerster, i. e., that the majority of the cases of appendicitis in pregnant women belong to the mild recurrent class, and can often be tided over until after labor. None the less, there is some danger of premature delivery from the presence of adhesions, and of the lighting up of fresh inflammation by the rupture of such adhesions and the diffusion of purulent foci, if such exist. If the latter are disturbed during labor the prognosis is grave.

Perforative appendicitis, occurring during the latter months of pregnancy, is a complication which must always cause great anxiety, whether the pus-collection is circumscribed or general. In the latter condition, the patient may succumb to general sepsis, miscarry, and have a subsequent puerperal infection, the child's chances being practically *nil*—not so much because of the high temperature (as some writers affirm), but from direct infection through the umbilical vessels.

If an abscess develops, the pregnant uterus must necessarily form part of its inner wall, when either premature delivery may occur, with rupture of the adhesions and diffusion of the pus, or infection of the organ takes place by direct continuity. The former accident is most to be feared, hence it is impossible to approve of Marx's suggestion to first perform *accouchement forcé*, and then to operate for the appendicitis.

My own views as to treatment practically coincide with Pinard's conclusions, viz: Treat appendicitis in pregnant female in the same way as in the non-pregnant. In a mild case carry the patient through pregnancy if possible, and operate as soon as convenient after delivery, if the usual evidences of appendicular trouble continue, since why should the woman be exposed to further risk during a subsequent pregnancy?

If local pain persists, and especially if an induration can be felt, operate as in any other case. Frænkel says that "in case of a relapse the operation is to be recommended, even

when the clinical symptoms are of a mild character, especially during the earlier months of pregnancy."

In the presence of perforation and abscess formation, operate without delay, disturbing the uterus as little as possible, and draining freely. Gerster seems to fear, above all, the displacement of the gauze drain by sudden emptying of the uterus within a few hours after operation, and even recommends stitching a modified Miescher's sac to the uterus, so that it will be carried downward into the pelvis by the descent of the contracting organ. It seems to me that this is unnecessary, if sufficient care is exercised to wall off the pus-focus above. Of course it is desirable to suture the upper portion of the wound if possible, or at least to plug it with gauze, firmly secured by strips of plaster, so that there will be no danger of extrusion of a loop of gut during labor. Opium would naturally be administered more freely than usual after these operations, to prevent uterine contractions. The preference in these cases is for the rectus incision, carried low down, in order to allow exploration of the pelvis. In perforation, with diffuse peritonitis after delivery, of course the median incision is preferable, with counter-openings at the most dependent points in the loins. Such cases are desperate and require heroic treatment. Technical details would be out of place here. A word as to prophylaxis. Assuming that the toxæmia of pregnancy is often of intestinal origin, the plain duty of the accoucheur is to prevent this condition not only by careful attention to the bowels (the use of laxatives and high irrigations) but by rigid supervision of the patient's diet, the restriction of meats, the cutting off of sweets and starches, and insistence upon the drinking of at least two quarts of water per diem.

Routine quantitative analyses of the urine will indicate if she is following out the directions. Habitual constipation and tympanites and colitis in the pregnant woman, with a diminished excretion of urea and excess of uric acid, are quite as important evidences of disturbance of metabolism as are the more alarming symptoms of renal trouble. If in addition the patient has a history of attacks of appendicular colic and suffers from more or less constant discomfort in this region, we may be sure that the conditions are favorable for the development of trouble that may call for surgical intervention, if it does not soon yield to medical treatment.

But, after all, as Kelly says, the true prophylaxis in a child-bearing woman who has had a well-marked attack of appendicitis is an internal operation.

VAGINAL CÆSAREAN SECTION. ITS INDICATIONS, ADVANTAGES, AND TECHNIQUE

By HENRY D. FRY, M.D., WASHINGTON, D. C.
Emeritus Professor of Obstetrics and Clinical Professor of Gynecology, University of Georgetown

SINGLE and multiple incisions of the cervix have been practiced for a long time, but the credit of bringing before the profession the value of the deep cervical incision or incisions is generally given to Dühressen, although the first vaginal Cæsarean section was performed by Acconci in 1896.

The operation has not claimed attention in the text books, but articles on the subject and the reports of cases have appeared in the medical journals of recent date.

Dühressen advised the operation April 1, 1895, and mentioned its advantages, particularly for rapid delivery of the mother in eclampsia. His first operation was performed to overcome the complications met with during labor in a woman who had been operated upon previously for vaginal fixation of the uterus. May 29, 1896, he presented the mother and baby to the German Surgical Society. At that meeting he submitted the following indications for vaginal Cæsarean section:

1st. "Abnormal conditions of the cervix and lower segment of the uterus. (Carcinoma,

myoma, rigidity, stenosis, partial pouch-like distention of the lower uterine portion.)

2d. "Dangerous conditions of the mother, which may be removed or relieved by prompt emptying of the uterus; affections of the heart, lungs and kidneys.

3d. "Conditions of the mother when death is imminent and can be foreseen."

The principle indication for the operation is to empty the uterus promptly in cases of grave eclampsia.

In *accouchement forcé* the first consideration is regarding the best and quickest method of dilating the cervix.

When the element of time is an important factor in the success of the operation, vaginal Cæsarean section is a great addition to our resources. The tampon, the bougie, rupturing the membranes, the colpeurynter and manual dilatation still hold a field of usefulness. In multiparæ, manual dilatation will often yield rapid results and still claims our confidence, but in many cases we have to deal with an undilated and undilatable cervix, and then we must look for more effective measures.

The Bossi dilator and different modifications of the steel dilator have been recently brought before the profession and met a favorable reception. The objection to these instruments is that lacerations sometimes result, the direction and extent of which are beyond control.

Other indications for vaginal Cæsarean section, besides eclampsia, are cancer of the cervix; rigidity of the os; premature escape of the waters; threatened rupture of the uterus; prolapse of the funis; placenta prævia; and hemorrhage from the normally implanted placenta.

In cancer of the uterus, the vaginal Cæsarean section and delivery of the infant is followed by vaginal hysterectomy. In threatened rupture of the uterus and prolapse of the funis, through an undilated os, the deep cervical incision and prompt emptying of the uterus may save the integrity of the uterus, in one case, and the life of the infant in the other. Prolapse of the funis calls for immediate birth of the infant unless the cord can be replaced. Other methods of dilatation offer little hope of saving the infant when the cervical tissue offers resistance.

In threatened death of the mother from advanced heart disease the prompt delivery of the child by vaginal Cæsarean section without effort on the part of the mother offers the best hope of success. The maternal mortality of premature separation of the normally implanted placenta remains high in spite of the best treatment. As a desperate resort abdominal section has been recommended. The rapid delivery offered by means of vaginal Cæsarean section was employed successfully in a case of this kind by Rhul. His patient was in a critical condition from internal hemorrhages, due to premature separation of the placenta. He used the colpeurynter to dilate the os, but the patient became so desperately ill, he gave saline transfusion and made deep incisions into the cervix anteriorly and posteriorly. From the time of beginning the incision to the extraction of the infant was six minutes. The woman was in a precarious condition but recovered.

In cases of rigid os met with in old primi paræ, and in slow dilation, resulting from premature escape of the waters, the deep cervical incision will appeal to one who has had any experience with the procedure.

Personally, I have grave doubts regarding the application of this operation, or any method of *rapid* dilatation, to the treatment of placenta prævia. The reduced maternal mortality from this serious complication is largely due to recognizing the value of *slow* dilatation. One might be tempted to employ the method in a case of placenta prævia complicated by a long-undilated cervix, but this condition presents the limited field assigned to abdominal Cæsarean section. If the vagina be not capacious, and if the vicious insertion of the placenta be central, or nearly so, I believe better results to mother and child will be secured by the classic Cæsarean section.

Summing up the various indications for this new operation, we recognize eminently its wide scope of usefulness in the treatment of grave eclampsia. It is not intended to replace the slower methods of dilatation in less urgent cases, but is advantageous when a woman is on the verge of convulsions in spite of active treatment to prevent them, or when convulsions have occurred, and the uterus must be emptied rapidly. Prolonged efforts at manual or in

strumental dilatation may precipitate the attacks.

In the maternity service of Columbia Lying-in Hospital, Washington, three vaginal Cæsarean sections have been performed under these conditions. The mothers recovered but the infants were not saved, as the utero-gestation had not advanced more than six months.

That manual dilatation in itself is not sufficient to meet the indication, in all cases, is demonstrated by the recent impetus given to the employment of steel dilators. Dr. Harris himself, to whom the credit for manual dilatation belongs, has recently brought out a very ingenious steel dilator.

The advantages of vaginal Cæsarean section are, first, the rapidity with which the uterus can be emptied. From six to ten minutes is all the time that operators have reported necessary, and as they become more familiar with the technique, it may be further reduced. Few operators have done more than one or two operations. Twenty to thirty minutes should complete the sewing up of the wound. There is little traumatism, and a clean surgical cut to sew up instead of leaving lacerated surfaces. In eclampsia the loss of blood resulting from the operation is beneficial, and the patient is returned to bed in the best condition to overcome toxæmia.

Regarding the danger of the operation, Dr. Holmes, of Chicago, mentions: 1, infection; 2, hemorrhage; 3, extension of the incision by tearing.

A proper technique reduces the danger of infection to a minimum. It is no greater than other operations upon the vagina and cervix of a pregnant woman, and less danger of infection from a clean cut co-aptated by sutures, than from a lacerated surface, the result of forcible stretching.

As a rule there is little hemorrhage from an incision in the median line of the cervix. Hemorrhage from the placental separation is equally liable to occur, but not more so, than when other means are used to empty the uterus, at or near the end of pregnancy.

The extension of the cut by tearing should be avoided by careful manipulation. After making an incision anteriorly the hand is introduced, and if more room be needed for delivery by version or forceps, this can be supplemented by a posterior incision. In making the posterior incision care must be taken not to open the abdominal cavity.

In a discussion on the subject of vaginal Cæsarean section at the seventeenth annual meeting of the American Association of Obstetricians and Gynæcologists, Dr. Meyer, of Columbia, Missouri, reported having witnessed an operation which ended fatally, from peritonitis, because the incision of the cervix posteriorly extended through and into the peritoneum.

Danger of injury to the bladder must not be lost sight of. This accident has happened to the writer, and he has witnessed it in the hands of another operator. In his own case a small vesico-vaginal fistula was closed two months afterwards; in the other instance the accident was fortunately recognized at the time, and successfully closed with catgut sutures.

Technique of an Operation

The anterior lip of the cervix is caught with two pairs of bullet forceps placed on each side of the median line. It is drawn down and the mucous membrane incised for an inch and a half laterally at the point of reflection. The bladder is dissected off as high as the peritoneum, and a long, narrow retractor serves to elevate it and expose to view the anterior surface of the cervix. The separation of the bladder can be made with a blunt dissector, or the finger, but it is safer to cut the bands of connective tissue with blunt-pointed scissors; otherwise sufficient force may be employed to tear the viscus. Instead of attempting to push up the tissues in the median line, it is better to work at each end of the incision in order to get under the sides of the utero-vesical ligament and sever it from the cervix. If a larger field of exposure be desired, a second incision can be made longitudinally downwards in the anterior wall of the vagina, extending from the middle of the transverse incision to near the meatus.

These points have been prominently brought before the profession by Dr. Goffe in his vaginal work on the uterus and its appendages. This dissection of the bladder may be carried

at once to the point of reflection of the peritoneum, or the cervix can be bisected as the dissection progresses, bullet forceps being changed to catch the side at the angle of the cut, drawing down and exposing to view fresh cervical tissue. The cervical incision extends from the external to and through the internal os. There is not much bleeding. The instruments are now removed and the hand inserted in the vagina, the uterine opening stretched and forceps applied, or version performed.

An incision of the posterior lip will not be required ordinarily, unless the infant be large. After emptying the uterus, the cervix is caught with bullet forceps on each side of the incision; it is drawn down and the retractor inserted to hold up the bladder anteriorly. The incision of the cervix is closed with catgut, and the vaginal wound sewed up. Some recommend a gauze drain between the cervix and bladder.

Report of a Case

November 18, 1904, I was called to see Mrs. A. in consultation with her family physician, Dr. Wade Atkinson. She was about six months advanced in her second pregnancy, the first pregnancy having terminated prematurely about five years ago.

There was anasarca, and she was suffering from headache and nausea, epigastric pain, and dimness of vision. These symptoms began about three weeks before my visit. The urine was solid when tested with heat and nitric acid.

I advised immediate emptying of the uterus. She was transferred to the hospital and vaginal Cæsarean section performed that evening. The os admitted one finger but was not dilatable. Wetherill's method of "ironing" out the cervix was tried for ten minutes, but made little impression. The bladder was dissected from the cervix and held up by a retractor. The anterior lip of the cervix was bisected; the incision extended through the internal os and was three and a half or four inches long. The hand was introduced, the uterine opening dilated, podalic version performed and the infant delivered. The placenta came away naturally and a hot intra-uterine douche was administered. The cervical incision was then united with catgut and a gauze drain placed between the cervix and bladder.

The infant lived about six hours. From the beginning of the incision to the extraction of the infant was seven minutes.

The entire operation was completed in twenty minutes. The urine cleared up rapidly, and in three days there was no albumen found. All the toxæmic symptoms disappeared, and in this respect she made a rapid convalescence, except for a time she suffered from albuminuric retinitis.

Urine escaped from her vagina, and her recovery was complicated by a small vesico-vaginal fistula, which later was closed.

EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

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SURGERY, GYNECOLOGY AND OBSTETRICS

Establishing a high-class medical publication at this time, when there are creditable journals occupying the field in all departments of medicine and surgery, presupposes motives on the part of its organizers which may interest those for whom such a publication is intended.

SURGERY, GYNECOLOGY AND OBSTETRICS was evolved in the minds of its organizers from a deep feeling that the field of the three allied specialties represented by its title is not overcultivated, and that there is already a place for a creditable magazine representing in one publication these three divisions of surgery.

It was also conceived that specialists, for whose success is required the highest adaptability for their calling, combined with the cultivation of technique, the scientific spirit, and the highest industry and experience, should have a direct supervision of the contributions to the literature pertaining to their own work. Hence practical surgeons, gynecologists, and obstetricians will direct editorially the trend of policy of SURGERY, GYNECOLOGY AND OBSTETRICS.

It was also conceived that a living journal should be a leader of the thought for which it stands, not alone a depository for established facts; that its editors should be in a position to discern and to bring forth the truths of thought of men of to-morrow, rather than to patronize reputations of yesterday at the expense of valuable new material; that practical men dealing with facts, actually engaged in the work of the day, are best fitted to discern the signs of the future, and to supervise and direct the course of its literature.

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The editorial staff of SURGERY, GYNECOLOGY AND OBSTETRICS feels deeply that there is a future for this kind of publication, and not one of its members will be satisfied if the journal does not take immediately a prominent place in the world of medical journalism and ultimately a leading position. They each realize that there is no call for another ordinary surgical journal, and that if they do not succeed in making this a journal far beyond the ordinary, there is no reason for its existence.

With this small light on our motives, we

herewith present our initial number, and hope that we may deserve the support of all readers interested in surgery, gynecology, or obstetrics.

FRANKLIN H. MARTIN, M. D.
103 State Street.

THE FUTURE OF GYNECOLOGY

In recent years the idea has been widely promulgated that the specialty of gynecology is doomed to extinction, and that it will gradually be merged in the practice of the general surgeon. The reasons given for this transition are mainly the following, viz.: that the most important measures employed in the treatment of diseases of women are surgical, and that the specialty is so well advanced that there is not very much more progress to be made in it.

Too strong a protest cannot be urged against these statements, which have been made mainly by surgeons who limit themselves chiefly to the mechanics of their profession, and who believe that the performance of several operations constitutes the practice of the specialty.

In reviewing the history of gynecology during the last thirty years, it is very evident that almost all the important advances have resulted from the work of men who have given their entire energies to the specialty. At the present day the leading authorities everywhere are those who still limit their attention to this sphere of work. It is not too much to expect that special workers will continue to hold the positions of authority which they command. As knowledge advances, the limitations of the intellect become more manifest, and the medical profession, in common with the general public, must realize that division of labor becomes more and more urgent. The genius who can achieve mastery in every field is not likely to be often found even among general surgeons, and the public are certain to be aware of this. There will always be a keen demand for those whose training and special work have given them pre-eminence in one department. In all medical schools, students have fewer opportunities to study clinical gynecology than any other branch of medicine. This is owing to the peculiar nature of the work. In dispensaries and hospitals gynecological patients must be treated with special delicacy and consideration, and they cannot be used for study as freely as patients suffering with other diseases. The great majority of graduates never have any opportunity of studying the subject in special clinics, at least for any length of time. The few who are fortunate enough to obtain special facilities, and who serve a long apprenticeship under skilled masters, are certain to gain special recognition, particularly if they have carried on original investigations of value.

The younger generation of gynecologists should not be discouraged. They will hold their positions if they deserve them, and they may deserve them by working faithfully and constantly at the difficulties and unsettled problems. There is the greatest need for thorough scientific investigation and criticism in every sphere—physiologic, pathologic, etiologic, and therapeutic. It is to be hoped that this journal may be the medium of communicating to the profession many researches which will give to American gynecology an even greater pre-eminence than it has yet reached.

J. CLARENCE WEBSTER.

THE FIRST CENTENNIAL OF OVARIOTOMY

Nineteen hundred and nine marks the close of the first century in which man has deliberately invaded the human abdomen for the cure of its manifold diseases. In 1809,

Ephriam McDowell, at Danville, Kentucky, removed an ovarian tumor from Mrs. Crawford, who promptly recovered. This emboldened him to go on with the work, his total list amounting to thirteen, with eight cures. Several of the fatal cases were mistaken diagnoses of fibroids of the uterus. Excluding these mistakes in diagnosis, the mortality of his true ovariotomies was so low that it was fifty years before any one secured a better record.

Led by the promptings of his genius, and supported only by the strength of his convictions, single-handed this man unlocked the portals of an unknown pathological world, and charted the main routes for the ultimate cure of its diseases.

As is the case with nearly all innovators and most great benefactors, his own generation, and many of the succeeding one, did little but deride his work. The second generation after him, though, began in the 50's and 60's to follow his teachings, and elaborate his indications. The third generation has done still better, until there is scarcely a disease of the abdominal viscera (save malignancy) that, if taken in time, cannot be cured. So great have been the results of his work in this generation, that there is scarcely a hamlet or village in the civilized world that does not contain a living monument to his foresight and courage.

Sixty-seven years after McDowell did his first ovariotomy (1876), the teachers and all the leading specialists in diseases of women in the United States came together and formed the first society whose function was to be the further elaboration of his ideas. It is "The American Gynecological Society." How faithfully its members have kept their sacred trust is shown by their transactions, which are too well known to need comment.

At the last meeting of this society, at Niagara Falls, on May 26th, it adopted a resolution recommending that Danville, Kentucky, be its place of meeting in 1909, and that the meeting take the form of a centennial celebration of the work of McDowell.

This is as it should be. General literature has its Schiller, Goethe, and Shakespeare, to whose memory all educated people are delighted to do homage; and for whom the German and English speaking worlds have long been holding their celebrations. Great as has been their ethical influence on the developing nations, greater still is the debt that present and future races owe McDowell.

When we remember that before McDowell taught us how to remove them, the mortality of ovarian tumors was one hundred per cent, that lesions of the appendix, of the gall bladder, of the uterine wall, of the pancreas, liver, and intestinal tract, were anywhere from fifty to ninety-five per cent, and that by following his lead their mortality has been brought down to from three to five per cent, it is easy to see that he is by far the greater benefactor of his race. The number of lives that are saved every year, in all parts of the world, as the direct results of his labors, certainly amount up into the tens of thousands. The whole world owes him a debt of gratitude which all nations readily acknowledge.

Nothing definite has been decided as to just what form this memorial meeting shall take, more than to put it in the hands of a committee of investigation, with orders to report.

We feel that we are expressing the wish of all Americans who understand the subject, when we say that it is our hope that this is the beginning of a movement that will make of the sleepy old town of Danville for the surgical world what Stratford is to the literary.

ARTHUR W. JOHNSTONE.

Madison Road, Cincinnati, Ohio.

TRANSACTIONS OF SOCIETIES

AMERICAN GYNECOLOGICAL SOCIETY

PROCEEDINGS OF THE THIRTIETH ANNUAL MEETING, HELD AT NIAGARA FALLS, MAY 25, 26, AND 27, 1905

MAY 25TH—FIRST DAY—*Morning Session*

The Society met at the Cataract House, and was called to order at 10:15 A. M., by the President, Dr. Emilius C. Dudley, of Chicago.

An address of welcome was delivered by Dr. Carl G. Leo-Wolf, of Niagara Falls, which was fittingly responded to by Dr. Ely Van de Warker, of Syracuse.

Address of President E. C. Dudley, THE EXPANSION OF GYNECOLOGY, AND A SUGGESTION FOR THE SURGICAL TREATMENT OF INCONTINENCE OF URINE IN WOMEN.

After pointing out the rapid progress that gynecology had made, the operation he suggested for incontinence of urine in women was based on the same principle as that by Albarran, namely, the advancement of the meatus urinarius to the clitoris, but this was done without dissecting the urethra free, and therefore it obviated the danger of sloughing of the urethra. It was performed as follows, in two steps. These we give in the language of Dr. Dudley:

First Step.—A horseshoe shaped surface is rather deeply denuded between the meatus urinarius and the clitoris, and to either side of the urethra throughout the entire length of it, as shown in Fig. 1.

Second Step.—The meatus is drawn up to a point near the clitoris and is secured there by means of two sutures (Figures 1 and 2). The lateral portions of the denuded surface are now closed (as shown in Figure 3). The effect of the operation is to replace and to retain in its functional relations the sagged displaced urethra. It will be observed that the two first sutures necessarily stretch the urethra upward to the region of the clitoris and that the lateral sutures must tend to hold it in its new position. By this means, it is proposed to straighten out the urethrocele, by longitudinal traction, and by lateral traction to collapse and to hold together the dilated walls of the urethra and thus to overcome the sacculation at the neck of the bladder where residual urine is apt to accumulate and give rise to trigonitis, cystitis and possible incontinence.

In many cases, it will be necessary to combine with the operation some appropriate surgical treatment for an associated cystocele and in nearly all cases to perform perineorrhaphy to relieve also relaxation of the posterior vaginal outlet. In one case, I saw fit to narrow the pouching urethra in order to overcome the urethral dilatation.

I have performed this operation five times since January 1, 1905. In the first four cases, relief from incontinence was immediate and, so far as I can learn, has been continuous. The last operation is too recent to be taken into account here. In one case, there was so much relaxation of the skin and other soft parts in the region of the clitoris that I feared the sutured urethra might pull these structures down to the old mal-position instead of being held up by them, but so far it remains well in place. In such a case again, or in the event of recurrence from such a cause, however, I should be disposed to make a deep oval denudation over the pubes on the mons veneris just above the clitoris, the longer axis of the oval being directed transversely, and to unite the margins of this wound by a transverse line of union so as to make the clitoris a fixed point on a sufficiently high plane to hold the urethra taut. For obvious reasons, this procedure would be preferable to the removal of the clitoris and the union of the meatus to the parts thereby exposed.

The patients operated on so far are too few and the time since the operations were performed has been too short to warrant any prediction of future results, but the meager and unsatisfactory literature on the subject and the intractable nature of the disorder in spite of such treatment as we have at our command, lead me to place before you this

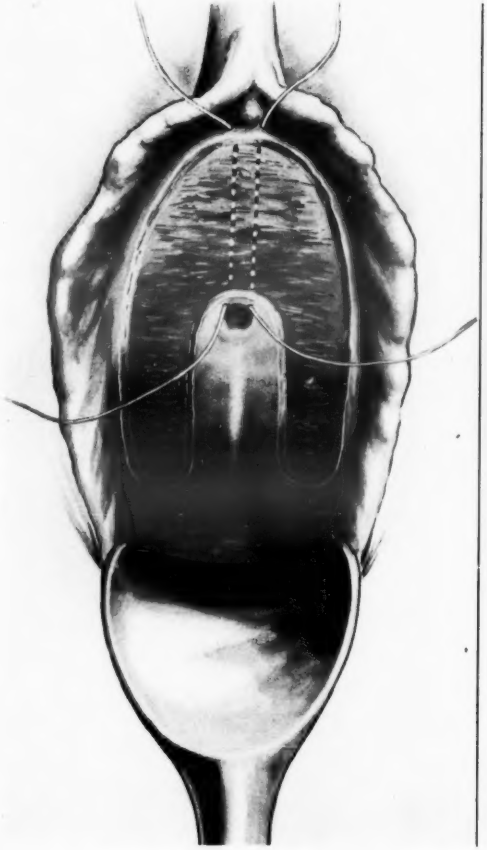

FIG. I

FIG. II

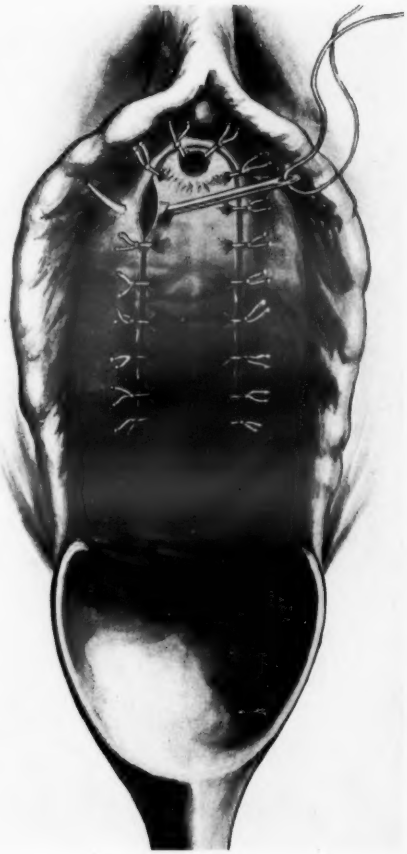

FIG. III

record of my own observation. The operation is so simple that I have been rather surprised not to find myself precisely anticipated in every particular, but so far as I have been able to learn, the operation in some essential respects at least, is novel. If it should be found, however, that I am duplicating the work of another, I desire to make due acknowledgment in advance, "for I would call no other man's labor my own."

Dr. George W. Jarman, of New York, read a paper entitled Accidental Rupture of the Non-Parturient Uterus, with Report of Cases.

He had used the term rupture instead of perforation since, in the majority of cases, the rent was caused by the tearing of the uterine tissue with the dilator rather than perforation with a sound or curette.

The author gave a brief resumé of the cases coming under his observation.

To draw some deductions from his own cases and those reported by others, it seemed to the author (1) that the operation of invading the cavity of the uterus should not be regarded lightly, and that the same care in the details of asepsis should be carried out as in a laparotomy. (2) That great care should be used in the introduction of steel dilators, and at no time forcing them into the cavity of the uterus. (3) That as one's experience in gynecology increased, the use of the uterine sound decreased, and the fingers more and more frequently took the place of the curette to remove secundines from the uterus. (4) That sterile water was the best fluid for irrigating the uterine cavity. (5) That if a rupture or perforation of the uterine wall occurred, it was better to perform a laparotomy and assure one's self of the safety of the patient than to hope that no untoward result would ensue. (6) That if one could not be certain of the asepsis of the curettage, it was better to use a small drain through the vagina, and a slightly elevated posture for the patient, than to regret its non-use after the development of septic peritonitis. (7) That in properly conducted cases observed soon after the accident there should be almost no mortality.

DISCUSSION

Dr. A. Palmer Dudley, of New York, said it had been his misfortune to perforate the uterus and enter the abdominal cavity four times. He was called to curette a uterus, and as he introduced forceps into the uterus, he withdrew what he supposed was a fungous growth or secundines, but this proved to be eight inches of the small intestine, which he had drawn down through the cervix. He passed the intestine back through the opening made in the uterus, and decided to let the patient alone. This was done, and the woman had since borne two children.

Dr. Herman J. Boldt, of New York, said it was not always that a perforation of the uterus caused serious trouble. In most instances it might be perforated without causing any trouble whatever. A great deal of discrimination should be used in those cases in which there was danger. In all instances of criminal abortion where there was any suspicion that infection had taken place, the abdomen should invariably be opened. He had perforated the uterus a number of times, and had seen it perforated by others. He mentioned a case in which a woman, who supposed herself to be pregnant, had her uterus curetted by a relative, a physician, who did so with the intention of producing an abortion. This physician withdrew a coil of intestine, and the speaker saw the patient forty-eight hours after the perforation had occurred. There were absolutely no symptoms present of any injury for the first forty-eight hours, and not until the third day, when suddenly severe symptoms of peritonitis developed; the abdomen was opened, and fourteen inches of intestine found which was deprived of the mesentery, with the abdomen full of blood and feces. The bowl had been torn. Here was an instance where perforation did not cause any symptoms until some time had elapsed. He recalled another instance of an abortion in which a curettement had been performed by a physician at his office. The speaker saw the patient three days later at the hospital, when she had septic peritonitis. There was blood in the abdomen. Patient died. In all instances in which there were evidences of sepsis, or where it was reasonable to believe sepsis was present, and due care had not been used, it was desirable to open the abdomen and close the uterine rent. In other instances of perforation of the uterus, the physician should do nothing except perhaps insert a small piece of gauze through the cervix, let the patient alone, and he believed the majority of cases would recover. In short, he had never seen a case that had pursued any other than a favorable course if the patient was let alone, and no further attempt made to douche the uterine cavity or to continue to curette it.

Dr. Eugene Boise, of Grand Rapids, Mich., reported a case of perforation of the uterus which occurred when he was an interne at the Charity Hospital in 1871, before the days of asepsis. The

physician in attendance passed a sound clear up to the handle. Nothing was done, and the patient had no symptoms. He recalled a case where he perforated the uterus with curette, following curettement of the sub-involuted uterus after abortion, and following the suggestion made by one of the previous speakers the uterus was thoroughly washed out, the patient put to bed, and nothing further done. She made an uninterrupted recovery.

Dr. Fernand Henrotin, of Chicago, had seen five cases in which the uterus was perforated. One was accidental. One was the result of the work of an abortionist, and on opening the abdomen, the patient being septic nine days after the supposed operation, he found a bougie nine inches long in the abdominal cavity. The patient recovered after undergoing a severe ordeal. The rule he had made for himself in these cases was this: If the accidental rupture made by the curette was small, without apparently any damage having been done, in a non-septic case, he would do nothing, and would feel inclined not to do anything. If, however, the patient was at all septic, he would resort to laparotomy. Twice he had resorted to laparotomy, and once to a posterior vaginal section in such cases. If the uterus was anteverted and perforation had occurred in the posterior wall, he would do a vaginal section, which required but a short time, and then insert a drain. If the uterus was retroverted and perforation was in the fundus or anterior wall, as it was apt to be, he would resort to immediate laparotomy.

Dr. Andrew F. Currier, of New York, agreed with those who had spoken that in a good many of the cases in which perforation had occurred no damage would result, if the intestine had not been withdrawn. If there was a mere puncture or perforation of the uterus, in many cases, if the woman was not septic, it was safe to leave her alone and do just as little manipulation as possible. On the other hand, if the injury to the uterus had been severe and the uterus was in a good condition, it was safe to cleanse the wound and close it. But supposing the uterus was in a soft, friable condition, as was the case with many of these patients whose histories had been narrated by the essayist, one was presented with the alternative of either closing the rent or wound or of removing the uterus. In many cases the removal of the uterus would be preferable, and more than likely result in more benefit to the patient than the mere closure of the rent. The key to successful treatment in cases of this kind was complete drainage, and if there was already a condition of sepsis in the uterus, and one simply closed the wound, he was by no means sure that the condition of sepsis would not continue. Therefore, in cases of that kind he thought it would be prudent to remove the uterus, leaving the wound in the vagina open, and getting free drainage in that way.

Dr. A. Lapthorn Smith, of Montreal, did not think it was the curette which was responsible in most cases for perforation of the uterus. He confessed to having perforated the uterus about six or eight times. He had no fear of the result if the parts were thoroughly aseptic. In two instances there was an opening in the back of the uterus, and in these, after miscarriage and after confinement, there was a fatty degeneration of the uterus. The organ was very soft and friable. He had repeatedly tried to see how much force it would take to perforate a uterus with the curette after it had been removed, and it took considerable force to do so.

Dr. Clement Cleveland, of New York, drew a distinction between the blunt and sharp curette. The speaker on one occasion perforated the uterus with a sharp curette at a time when he was talking to a class about the carefulness with which the instrument should be used. The patient was to be operated for a lacerated cervix and lacerated perineum. He immediately postponed the operation, put the patient to bed, and no bad result followed.

He drew attention to the injury done by the sharp curette in the hands of the general practitioner. The dull curette would hardly do much, if any, harm; it did a great deal of good; but the sharp curette was doing an enormous amount of injury. It was fraught with the greatest harm to future women if it was used in the careless way it was to-day.

Dr. William E. Moseley, of Baltimore, stated that in several cases that had come under his observation in the hands of others, there had been a rupture of the uterus from the internal os towards the external os, which rupture always, so far as he knew, took place between the folds of the broad ligaments. This, on account of the location of the rupture, took care of itself if the patient was kept quiet and the parts kept clean. He did not think this form of rupture was recognized as frequently as it really occurred. He thought the danger of perforation of the uterus by dilating other than this was minimal if dilators were used which

had parallel blades, if intermitent force was used.

As regards the use of the dull and sharp curette, both had their place, and personally he first introduced the dull curette largely for diagnostic purposes, and then the question as to whether the dull of sharp curette should be used depended upon the character of the tissues one had to deal with. There might be some cases in which there was more danger of perforation of the uterus from the use of the dull curette than from the sharp instrument. If the tissue to be removed was firm or hard, it could be taken away with the sharp curette with less pressure than by the use of the dull instrument, and that therefore the danger of perforation of the uterus was not so great from the instrument as the amount of force used in withdrawing it and of introducing it. It should be introduced by its own weight, and if the cervical canal had been properly dilated the instrument would pass up to the fundus without practically any force being exerted. If a large amount of tissue had to be removed, with the dull curette it required a considerable amount of force, and this might be an additional factor in perforating the body of the uterus.

Dr. William H. Wathen, of Louisville, did not think the dull curette had any place in the surgery of an experienced gynecologist. It had no place anywhere except possibly to pull out some decidual remains that lay comparatively loose in the uterus. Curettage should be done by the sharp curette, or decidual remains should be removed by the finger in nearly every instance, and this could be done in immediate abortions nearly always, dilating with the finger and removing decidual remains with the finger. Occasionally one might use forceps to remove some of the membranes that were left in the uterus.

As regards dilatation of the uterus, in his early experience he dilated a great deal. Now he did not dilate the uterus one time in fifty curettage cases, and he found there was no need for it. He could get into the uterus with two sized curettes, and invariably when he had concluded the curettage without dilatation, he was able to introduce the average-sized uterine applicator and wash out the uterus.

Dr. Ely Van de Warker, of Syracuse, New York, said that in seventy-five per cent of the text-books it was stated that if one wanted to get ideal results he had to remove the endometrium; one had to scrape it out, clean it out, and that this was the ideal thing to be aimed at. It impressed him as not only an absurd, but a most dangerous, proposition to so instruct the general practitioner. He thought the cause of danger came from two sources: (1) The personal equation of the operator, and this was variable; (2) the element of danger furnished by the instruments themselves, and this was a fixed quantity. The dilator was a dangerous instrument. The curette, the scraper, whether it was dull or sharp, was attended with more or less danger. But he thought the greatest danger accrued from the dilator. The time when a woman needed curettage most was after imperfect removal of all debris attending normal labor, or especially after an early abortion, when the process of involution was going on for months, and during that whole period the uterus was friable, its muscular wall easily ruptured, and at which time the dilator was used and did the greatest harm. He agreed with Dr. Wathen that it was unnecessary to use the dilator to the extent it was employed. He said the late Dr. Pryor had proved positively that the flushing curette was a dangerous instrument. In brief, the operation of uterine curettement was essentially dangerous, and should be confined to the hands of good gynecologists, and never done by the general practitioner.

Dr. Seth C. Gordon, of Portland, Maine, said occasionally he had pushed a sound through the uterus, but by leaving the patient alone he had never seen any harm result.

Dr. Philander A. Harris, of Paterson, N. J., said there were two causes of perforation of the uterus. One was the sound and the other forceps. He had perforated the uterus twice, once through the corpus posteriorly, and once anteriorly. The perforation posteriorly was done by the currette, and the one anteriorly by his dilator. For the purpose of studying all of the cervices which he had dilated, almost all of them had been dilated with an instrument which registered the exact number of pounds exerted by the operator. This instrument was known as the obstetrical dilator, which he exhibited at the Boston meeting last year, attached to which was a definite measuring device by which he knew how many pounds to apply in order to effect dilatation.

Dr. T. A. Reamy, of Cincinnati, Ohio, said he curetted a woman a short time ago in consultation with Dr. Mitchell, whose condition was such that he (Dr. Mitchell) was in doubt as to whether there was cancer of the corpus or the result of a chronic endometritis. The speaker curetted the uterus rather thoroughly, and in so doing perforated it. He did not finish the curettage, because he was

of the opinion that the woman's trouble was malignant, although it proved not to be so. However, a pelvic abscess resulted subsequently from this perforation, which was opened, and the patient made a good recovery.

DR. EMILIUS C. DUDLEY, of Chicago, stated that within five weeks he had the misfortune of perforating a uterus with a curette. The uterine wall was very thin. On opening the abdomen he found that the wall at the point of perforation was not over the thirty-second of an inch thick, the thin wall being due to a localized pathological condition. A considerable quantity of bloody fluid was found in the cul de sac of Douglas, which was sponged out, the abdominal cavity flushed out with salt solution and after closing the wound in the uterus with a purse-string suture the abdominal wound was closed and the patient made a good recovery. He was led to make a laparotomy in this case, because the discharge from the uterus was purulent, although the fluid removed from the abdominal cavity showed no bacteria.

THE TREATMENT OF RETROVERSION OF THE UTERUS BY SHORTENING THE UTERO-SACRAL LIGAMENTS.

DR. ARTHUR W. JOHNSTONE, of Cincinnati, stated that clinical experience had taught him two facts: *First*, that there was something whose duty it was to pull the lower segment of the uterus upwards and backwards; *second*, that the round ligaments never lifted the uterus in the least, but acted as guy-ropes to prevent the fundus from being pushed back beyond its limits. Before this occurred he had shortened the round ligaments several times, with only partially satisfactory results. Some still complained of dragging sensations and he found that while the retroversion was relieved more or less, the position of the whole uterus was on a lower plane than natural, and there seemed to be a prolapse of all the pelvic viscera.

Some three years ago he began to work over again the comparative anatomy of the pelvis. When he came to the ligaments of the horizontal animal's uterus, he was surprised to find that the sacro-uterine ligaments were the only ones that seemed to give any support.

The broad ligaments had the same intimate relations with the anterior bones of the pelvis that they had in the erect animal; but as the bladder was behind them, an allowance must be made for it to fill and empty at their expense, they had to be very long and loose. While they did something to keep the cervix from sliding down the inclined plane, they were so fluffy that they alone could not prevent it. As in the erect animal when on all-fours, Douglas' pouch lay just above the cervix and came a good ways back along the vagina, on either side of it from a strong anchorage to the straight flat sacrum, came down two large strong utero-sacral ligaments that were inserted into the uterus and cellular tissue where the broad ligaments joined it at the internal os. Here, then, was the sling that held the cervix at the top of its inclined plane, and prevented it from sliding down on its intestine-like body, causing all sorts of torsions and intussusceptions. When the erect position was assumed, there was no change in the relations of the pelvic viscera, the only alternation being in the curving of the sacrum, which gave the utero-sacrals a better angle at which to lift the whole weight of the now diminished single uterus. The "sling" type was still retained, but as the single uterus was top-heavy the round ligaments were given more power to hold it forward in its proper place on the bladder when empty, and to keep it from pushing the uterus too far back when full.

Here was the explanation of the undoubted good that had been done by the Hodge-Smith-Thomas pessary, with its many modifications. A healthy pair of utero-sacrals would stand a great amount of strain, but a slight loss of their tone would at once allow a prolapse to begin. The Hodge pessary took the strain off these ligaments, and if the cause of their softening was removed, they might regain their natural tone.

Being sure that the utero-sacrals were the starting-point of this vicious cycle, the question arose how to get at them. When the trouble was complicated with bad tubes or anything that required the abdomen to be opened to save life, it must be done and the ligaments dealt with as the case would permit. He had found by experience with Alexander's operation that there were a large number of cases with this trouble that had no other complication beyond a chronic metritis, that it would be taking an unwarranted risk to have a laparotomy. For a year he systematically studied every pelvis that he invaded for any purpose by the vaginal route. In some dozens of cases, in spite of pathological changes, he found that he could have put a crimp in the sacral ligaments if there had been any reason for doing it; but he also found that the transverse cut sometimes went through the ligaments at their uterine insertion and destroyed the landmarks. It would be easy enough to operate through a large multiparous vagina, but as there were liable to be other complications in this class that would need simulta-

neous repair, and so complicate his results, he decided to try it on virgins first. So, on November 5, 1903, he operated on the first case. She was 25 years old, of slight build, had a simple retroversion, with the usual metritis, and symptoms that had lasted for five years. The hymen was intact, and the vagina very small. With small Sims specula in the dorsal position he exposed the cervix and caught its posterior lip with a volsella forceps after a thorough curettage. Beginning at the vagino-cervical junction at the apex of the posterior fornix, he made a two-inch incision through the vagina in its long posterior central axis. On breaking through the peritoneum into Douglas' pouch, he found the utero-sacrals on either side of his finger. The insertions into the uterus and periuterine tissues were just above and slightly to the side of the upper limit of the incision. From these points each could be traced out on its respective pelvic wall as far as the finger could reach. Picking them up with a long pair of forceps as high as he could get them, they were drawn down into the incision and shortened as much as two inches by suturing with catgut. The needle punctures were all inside the peritoneum, and the stitches were not tied until all the threads were in place on both sides. Before drawing them up tight, the cervix, which was still held by the volsella, was pushed back to an exaggeration of its normal position and held there until the knots were driven home. The incision was then closed with catgut, and a salmon gut drain put into the uterine cavity. The after-treatment was that of any ordinary peritoneal operation, and the convalescence was like that of a trachelorrhaphy, the temperature never going above 99½°. When he examined her two weeks after the operation, the uterus was, if anything, in anteversion, and had stayed so ever since. All her old symptoms had disappeared, and she had gained 15 or more pounds in weight, and was attending to her full duties. While ninteeen months was hardly long enough to say that the ligaments would never stretch again, still it was a pretty good test of its improbability.

He had operated upon a second case whose vagina was, if anything, smaller than the first. But in spite of it he succeeded in doing the same operation, with the same results up to the present time, which was now ten months since the operation.

What the ultimate results would show, he could not say, but since there had been no sagging of the uterus in either instance, he believed that the results would be permanent; for the first step in a retroversion was a coming downward and forward of the cervix. As the metritis was completely cured in both, he could not see what was to soften the ligaments again. Neither of these cases had anything done but the curetting and the shortening of the utero-sacral ligaments. Had the uterus been large or heavy in either instance, he would have been tempted to have combined the Alexander with it; but as both were ordinary virgin organs, and he wanted to test the sustaining power of these ligaments, he did nothing else.

Dr. E. E. Montgomery, of Philadelphia, followed with a paper entitled, A New Plan of Procedure in Retro-Uterine Displacements. (This paper appears in this issue. See page 11.)

DISCUSSION

Dr. J. Wesley Bovee, of Washington, D. C., said there were several points to be considered in order to treat properly, a retro-displacement of the uterus. The principal one of these was ligamentation of the uterus or the mechanical supports of it. There was no one operation which was applicable to all cases, because the causes of retro-displacement were varied. There were many cases in the virgin uterus of what might be called congenital retro-displacement, and in these the trouble lay in faulty ligamentation. The vaginal roof was not perforated in the proper place; it was too far forward. This point was clearly brought out by the elder Byford, in one of the editions of his book on gynecology, published in 1882, in which he (Byford) laid down the rule that if the cervix perforated the vaginal roof less than two and a quarter inches from the pubes, it was abnormally forward. In some cases the leverage was too great toward pulling the cervix forward. If the cervix was allowed to protrude forward or to approach the pubes, the uterus was subjected to intra-abdominal pressure from the fundus, rather than from the posterior wall, and this tended to force it downward and backward in the arc of a circle. Therefore, what was needed in many of these cases was to change the leverage, to separate the anterior viginal wall from the cervix, and re-attach it at a higher point. If the utero-sacral ligaments were attached too high upon the cervix, they should be detached and brought down nearer to the tip of the cervix, so as to change the leverage. It was manifest in many post-operative cases, especially those in which there had been posterior occipital presentations, that the surrounding fascia, as well as the utero-sacral ligaments, had been ruptured during parturition. In some cases the posterior fornix vaginæ was absent; the posterior vaginal

wall flopped down into the vagina, and in such cases one had to secure the fascia as well as repair the ligaments. These cases should be treated along nature's lines, that is, repair the present supports, and not try to introduce additional supports. In a number of cases he was led to believe that the trouble lay in a weakening or improper attachment of the utero-sacral ligaments; this weakening might be due to a low grade of infection spreading onward; it might be due to malattachment, and it was often due to rupture in severe occipital presentation cases. In some cases the injury was not low down; the utero-sacral ligaments were higher up, in a position they could not be reached readily through the vagina, and for that reason he believed the principal operation should be done upon them, and in many instances he would operate on the round ligaments as well. He mentioned those cases in which the shortening of the utero-sacral ligaments could be done best through the vagina, as well as those which could be dealt with more successfully through the abdomen. These ligaments might be shortened without entering the peritoneal cavity.

He agreed with Dr. Johnstone as to the longitudinal incision being preferable to the transverse, because one could not only avoid injury to the ligaments with scissors or knife in making the incision, but he could suture the fascia at the ends of the incision, so that when the operation was finished there would be a transverse line of suturing instead of longitudinal, not so much on the vaginal wall or the mucosa, but in the fascia between that and the utero-sacral ligaments. Then the latter could be shortened after the fashion of the Wylie, or Dudley, or some operation could be done on the round ligaments through the abdominal wall.

Dr. J. Riddle Goffe, of New York City, said that when the perineum was torn through into the rectum, the uterus remained in place unless complicated by inflammatory conditions, and was retained by its ligaments. The most important ligament in sustaining the uterus was the utero-sacral, as stated by Dr. Johnstone, and this was in accordance with the speaker's studies for the last ten years. If there was any tissue that we were to utilize in retaining the uterus when it became displaced, it was the utero-sacral ligament. He had resorted to both the vaginal and abdominal routes in dealing with the class of cases under discussion; but ordinarily he shortened the utero-sacral ligaments through a vaginal incision, and in most cases he had supplemented this by also shortening the round ligaments through an anterior vaginal incision. Where the utero-sacral ligaments were difficult to reach, he did not attempt to shorten them, but he shortened the round ligaments through an anterior vaginal incision; and, as pointed out in a paper read by him in Denver, in 1896, he believed the only purpose subserved by the operation of shortening the round ligaments, whether it be the Alexander operation, the Dudley operation, or what-not, was to take the stretching and weight off the utero-sacral ligaments, and allow them to recover their tone, and unless they recovered their tone the operation was a failure. He had demonstrated the practicability of this operation to his own satisfaction.

He had no sympathy whatever with the various procedures on the round ligaments. He did not believe the purpose of the round ligaments was to hold the uterus in place. He regarded the function of the round ligament simply to limit the excursions of the fundus when the bladder was filled, and to restore it to the normal position when the bladder was empty. In gestation it had the additional function of keeping the fundus well to the front, and of preventing the intestines from getting pinched between the fundus and abdominal walls.

Dr. George Gellhorn, of St. Louis, Missouri, stated that so far as the utero-sacral ligaments were concerned, Wertheim, in Vienna, devised a method of shortening these in 1895. He had the opportunity of seeing the operation performed by him in 1896, and so far as he knew Wertheim had abandoned the operation. It occurred to him that the utero-sacral ligaments in a normal condition were too small and too thin to hold a large uterus in place. Normally, the utero-sacral ligaments were but peritoneal folds, with a small amount of smooth, muscular fiber and connective tissue, and it was only when inflammatory conditions were present that the utero-sacral ligaments were large, short, and easily palpable. Mackenrodt had pointed out that the uterus was kept in place mainly by the strong parametria which he called cardinal ligaments, and it was between these ligaments that the uterus was kept in place. As soon as the tonus of these ligaments was relaxed, the uterus would fall into retroflexion.

Dr. T. A. Reamy, of Cincinnati, Ohio, did not think the statement should go out that the utero-sacral ligaments were the only supports of the uterus. He thought the round ligaments played

a part in assisting the utero-sacral ligaments in performing their function in sustaining the uterus. The utero-sacral ligaments could not accomplish what they were alleged to do and do it if they were alone in supporting the uterus. The utero-sacral ligaments prevented anterior movement or displacement of the lower segment of the fundus, and of the vagina at that portion where it joined the lower segment of the uterus. He had, in several cases in his own experience, known the uterus to be retroverted, the utero-sacral ligaments were not performing their function properly; yet by shortening the round ligaments and having the patients rest for some time, supplemented by the use of a pessary, they got well.

Dr. George W. Jarman, of New York, endorsed what Dr. Reamy had said. In 1895 the speaker read a paper on retrocession of the uterus. The uterus was carried back too far toward the sacrum; there was marked anteflexion at the junction of the cervix with the uterus, the uterine wall being carried back toward the sacrum. His treatment for these cases was to cut the utero-sacral ligaments through the cul de sac, hooking the ligament with his finger, drawing it down and cutting it. He had done seven of these operations, four of which he was able to refer to, and in not a single one was there any retroversion or retroflexion of the uterus. Not only did he cut the utero-sacral ligament through its surface, but packed in gauze so as to push the uterus well forward.

Dr. Seth C. Gordon, of Portland, Maine, endorsed the operation described by Dr. Montgomery, and said that about four years ago his assistant (Dr. W. L. Cousins) operated, bringing the round ligaments through the abdominal wall by a median incision. He published an account of the operation in a local medical journal, and shortly after received a letter from Dr. Tod Gilliam, of Columbus, Ohio, stating that he had pirated his (Gilliam's) operation. He knew that Dr. Cousins had never seen Dr. Gilliam's report, and that both had done the operation independently of each other.

In his experience, the operation, as performed by Dr. Cousins, had been the most satisfactory of any method he had tried. The principle was essentially that of the Alexander operation, with the exception that the ligament was not brought through the whole canal. He also used the method in cases of procidentia in old women within the last two years, with satisfactory results.

Dr. Clement Cleveland, of New York, expressed the belief that the uterus was supported by both the round and broad ligaments.

He mentioned an operation devised by one of the assistant surgeons of the Women's Hospital, New York, Dr. Bissell, and said he had been doing it for a number of years, and his results had been satisfactory. In brief, the method consisted of shortening the round ligaments and also the anterior layer of the broad ligament.

Dr. Herman J. Boldt, of New York City said that many operations had been devised for retroversions of the uterus. He had done a large number of Alexander operations in cases in which this operation was indicated, and it was in those cases where the body of the uterus could not be held anteposed by pessary. The result was that if the round ligament was shortened by the original Alexander operation, only a small part of it was shortened, utilizing the heavier part of it for holding the uterus anteposed. He had examined a number of patients who had gone through three or four pregnancies after this operation, in whom the uterus was found anteposed. The Alexander operation was not indicated in descensus of the uterus; but when one had a case of simple retroflexion, with possibly retroversion, shortening of the round ligaments, whether they were there for the purpose of holding the uterus anteposed or not, was the means of holding the uterus anteposed if the operation was properly done. He saw a woman a few days ago who had undergone three confinements since the performance of this operation, and the uterus had remained in its anteposed position after each confinement.

Dr. Palmer Findley, of Chicago, read a paper entitled, Arterio-Sclerosis of the Uterus as a Factor in Uterine Hemorrhage.

A resumé of all cases was given by the author, and four new cases were reported, together with a complete bibliography on the subject. The writer dealt exclusively with the so-called essential or idiopathic hemorrhages, the cause of which was not definitely determined. He argued that arterio-sclerosis of the uterus was not the prime factor in bringing about these obscure hemorrhages. In his opinion, muscular insufficiency was the underlying cause, and the sclerosed vessels were but contributing factors.

He presented the following conclusions:

1. Metritis, as a primary lesion and independent of infection, is not accorded the consideration which the frequency of its occurrence and its clinical significance would warrant.

2. The muscular fibers of the uterine wall have an important function in controlling the caliber of the blood vessels, and hence in regulating the blood supply to the uterus, as evidenced in the relaxed condition of the uterine wall during menstruation, in post-abortion, and post-partum hemorrhages, and in the free bleeding which accompanies curettage when the uterus has relaxed under the irritable influence of the curette. In all these conditions the hemorrhages are controlled by the contractions of the uterus.

3. Any event which lowers the muscular tone of the uterus may occasion an abnormal loss of blood into the endometrium and uterine cavity.

4. Prominent among the factors which contribute to muscular atony in the uterus are the wasting diseases, anemias, and acute febrile diseases, which are not infrequently accompanied and followed by uterine hemorrhages as the result of weakened support to the vesical walls.

5. Fibrosis uteri is a far more common cause of muscular insufficiency. The building up of connective tissue in the uterine wall at the expense of the muscular elements is the result of long-continued passive congestion, which in turn is due to numerous general and local lesions, such as an imcompetent heart, obstructions in the lungs, liver, kidney, and spleen, abdominal swellings, varicose veins of the pelvis and uterine displacements.

6. The walls of the blood vessels share in these hyperplastic changes, in that the media and adventitious coats of the vessels are thickened. In this manner the elasticity of the vessel walls is impaired, and if the lumen of the vessels is not narrowed by contraction of the vessel walls, and thickening of the intima, there will be added reasons for various engorgements of the uterine wall and capillary oozing at the endometrium. In such cases the prime factor in the causation of uterine hemorrhages is muscular incompetency; the thickened vessel walls and the remote embarrassments to the circulation are but contributary factors.

7. This condition of the vessel walls is to be distinguished from the arterio-obliterans of the normal senile uterus, in which the vessels are partially or wholly obliterated by the thickened intima. In such cases hemorrhages do not occur, for the reason that the blood supply is greatly diminished.

8. In none of the recorded cases were hemorrhages seen to come from ruptured vessel walls, nor were aneurysms of the arteries seen in the uterine walls. On the contrary, the escaped blood was furthest removed from the sclerosed vessels and more evidently capillary. We are, therefore, not justified in ascribing the hemorrhages directly to the sclerosed vessels.

9. The diagnosis can only be made by first excluding all other possible causes, such as polyps, carcinoma, and fibroids.

10. Hysterectomy has been frequently resorted to after repeated curettements have failed. Palliative methods—i. e., rest, ergot, styptic applications to the bleeding surface, and finally tamponading the uterine cavity—may be resorted to, but have repeatedly failed.

First Day—*Afternoon Session*

Dr. Eugene Boise, of Grand Rapids, Michigan, read a paper on Post-Operative Vomiting. (This paper appears in this issue of the Journal. See p. 23.)

Discussion

Dr. A. Lapthorn Smith said, in regard to vinegar or diacetic acid, he was not sure that this had very much effect. He advocated large quantities of hot water for patients to drink to wash out the ether that had been swallowed during its administration. Hot water to wash out the stomach amounted to the same thing at gastric lavage.

Dr. Matthew D. Mann, of Buffalo, referred to the character of the anesthetic. In some patients ether produced more vomiting than chloroform. He did not believe the character of the anesthetic had as much to do with vomiting as the amount of the anesthetic. The more deeply a patient was anesthetized, and the greater the amount of anesthetic used, the longer time it would take the patient to get rid of it, and the more the vomiting center was irritated. For three years he had been using ether, preceding it by chloride of ethyl. Invariably he could put a patient under the influence of the anesthetic in two minutes; thus the amount of ether taken for an operation of an hour's duration was much less than he had formerly used. Before he used chloride of ethyl as a preliminary anesthetic, he employed nitrous oxide; but this was so difficult to manage; it was hard to carry around; it was largely a nuisance, and so he substituted chloride of ethyl for nitrous oxide, since which time the amount of vomiting had been much less.

Dr. A. Palmer Dudley discussed post-operative vomiting from the nervous side. What were the major nerves that supplied the heart, stomach, and diaphragm? The pneumogastric and the

phrenic. These were paralyzed during anesthesia. The spinal cord was held in abeyance during major operative work. Could we expect those nerves which governed the stomach, the diaphragm, reflex action, and those which governed the solar plexus to resume their action immediately we put a patient to bed after operation? No.

If one considered the preparatory points mentioned by Dr. Mann, there would be less reflex action on part of the stomach in post-operative work.

Dr. Andrew F. Currier said that one great advance in recent years in connection with this subject was to be seen in the fact that in very many cases at the present time, the administration of anesthetics was entrusted to one who had been trained and specially experienced in that particular line.

He thought the preliminary administration of chloride of ethyl, as Dr. Mann had suggested, or nitrous oxide, as had been the custom with him in recent work, was much more satisfactory than the prolonged and irritating effects which came from the first stage of anesthesia through the administration of ether alone.

Dr. C. C. Frederick, of Buffalo, New York, said he did not place much reliance on the idea of patients swallowing the anesthetic, or that ether from the stomach was a source of vomiting, because all had had the experience that some patients who were given an anesthetic for a few moments, for a slight operation, or for an examination possibly, would vomit more after the preliminary anesthesia than they would after prolonged anesthesia given for a major operation.

He agreed with Dr. Mann as to the preliminary use of chloride of ethyl, followed by ether or chloroform. There was no question but that some patients could take one anesthetic better than another. He had used nearly everything that had been suggested in medical journals to quiet nausea from anesthetics, and frankly stated that he did not believe he had ever given a patient anything that seemed to give marked relief.

Dr. Arthur W. Johnstone said he had had the same man give his patients anesthetics for the last ten years, and during that time there had been a decided change in the amount of nausea his patients had. In fact, he had reached a point where he never expected it, or that it seldom occurred to amount to anything. He attributed the great decrease in the amount of vomiting after operations partly to careful preliminary preparation of his patients, cleaning the stomachs and intestinal canals of patients thoroughly, as well as the liver and pancreas.

Dr. Daniel H. Craig, of Boston, by invitation, referred to his work in connection with the use of eserin in the prevention of post-operative intestinal paresis. He did not consider eresin in any sense a specific against post-operative vomiting, but he thought it had just the same effect on cases of post-operative vomiting as gastric lavage, whether done before the patient left the operating table or later. The effect of small doses of calomel given before operation, or divided doses of calomel given after operation, with all the various modifications, was the stimulation of normal peristaltic action. With lavage the stomach was emptied. The principal thing was the establishment of normal peristalsis, or approximately normal peristalsis in the intestine below the stomach. Eserin had no effect on the motility of the stomach itself, but it did in re-establishing or preventing stoppage of intestinal peristalsis. Certainly it was done to keep the stomach clear from any fermenting, disintegrating products or partial metabolism, and it seemed to him that eserin did the work far more efficiently and effectively than divided doses of calomel which necessitated giving the paitent medicine by the mouth at a time when she was nauseated and illy prepared to take it.

Dr. Malcolm McLean, of New York, said that be believed in a skilled anesthetist, and the use of a preliminary anesthetic such as chloride of ethyl or nitrous oxide.

In the speaker's own experience, in operations performed before ten o'clock in the morning, the patients had much less nervous disturbance and less vomiting. He did not know how far this would hold good in the experience of other operators.

Dr. George Gellhorn was inclined to think that one of the foremost factors in producing post-operative vomiting was the secretions from the mouth and throat, loaded with chloroform or ether. In the stomach the chloroform or ether could not evaporate, and it irritated the mucous membrane of the stomach until vomiting was produced. Vomiting would cease after these secretions had been removed. For that reason lavage of the stomach was of benefit; it relieved the condition at once. Secretions from the mouth or throat should be prevented, if possible, from accumulating. For about a year he had employed

as a preliminary, the hypodermic injection of scopolamin, together with morphine, about an hour before operation. It arrested the secretion from the mucous membrane. He gave scopolamin and morphine in the proportion of 1-150 of a grain to 1-6 of a grain of morphine. The effect was that the mouth and throat were absolutely dry, and remained so during the operation. After giving the injection, the patient was kept in a dark room and no one was allowed to go near her, so that the factor of nervousness, which was frequently disagreeable, was removed. With scopolamin and morphine as a preliminary, the amount of ether used was minimized. Until about half a year ago he employed nitrous oxide and ethyl chloride to induce narcosis, but thought it was dangerous to put a patient so suddenly under profound anesthesia, and it appeared to him more natural to let this change from a conscious to an unconscious state take place gradually. For that reason he had given up ethyl chloride. Since resorting to this preliminary measure, he had hardly ever seen a patient vomit after operation. At any rate, he had not seen any of these prolonged vomiting spells that used to be the rule rather than the exception. Some authors had claimed that atropine and morphine injected before operation had the same effect. He could not agree with that statement. He had used atropine and morphine without the drying effect of the mucous membrane, and without the minimizing effect of the amount of anesthetic to be used. In the use of scopolamin and morphine the pain after operation was greatly reduced. As a rule, the patients could sleep from one to four hours after operation, and when they awoke the first sharp pain after operation was hardly ever present.

Dr. Reuben Peterson, of Ann Arbor, Michigan, said his experience had been entirely different from that of Dr. Gellhorn in the use of morphine and atropine. He had used the combination six or seven years, giving about one-sixth of a grain of morphine, and 1-150 of a grain of atropine, about three-quarters of an hour before the anesthetic was administered. He had seen a difference in regard to the drying of the secretions; before he used these drugs there used to be excessive secretion; there was gurgling; the mouth and throat had to be swabbed out. Since he had employed morphine and atropine, this had almost entirely ceased. He had not attributed, however, the absence of vomiting to the use of these drugs entirely, but had ascribed it to thorough preparation of the patient, and to better methods of administering chloroform and ether.

Dr. Edward P. Davis, of Philadelphia, said that the remarks that had been made concerned patients with whom there had been abundant time for preparation. One was obliged sometimes to operate upon emergency cases, as ruptured ectopic gestation, and other cases of a critical nature, which must be attended to at once. In these, post-operative vomiting might be exceedingly depressing and dangerous. What could be done to prevent it? While the patient was on the table, and before the operation was quite completed, intra-venous saline transfusion or injection would prevent post-operative vomiting as well as prevent shock. The hypodermic use of strychnia and atropine would lessen shock and lessen post-operative vomiting, as would also the application of heat to the cerebellum, or a hot water bottle or pack to the occiput, or the rectal use of saline solutions, and the hypodermic use of strychnia for the first ten or twelve hours after the operation.

Dr. Ely Van de Warker could not recall an instance of severe vomiting in cases of delivery, where the anesthetic used was chloroform. He hardly thought it was so much the quantity of the anesthetic used that caused the vomiting as some other factors, quantity among them, which would explain what he called the anesthetic mystery.

So far as morphia was concerned, he entered a protest against its use as he had had several frights from it, and in one instance nearly lost the patient.

Dr. Fernand Henrotin said that for a little over a year he had been resorting to quick anesthesia with nitrous oxide preparatory to the administration of ether, using as little of the anesthetic as possible, immediately washing out the stomach thoroughly after every operation, and giving a hypodermic injection of eserin before the patient was taken off the table. This combination had made an immense difference in his results.

Dr. J. Wesley Bovee thought the proper procedure was to prepare patients as well as the conditions would permit. Then came the proper administration of the anesthetic, giving as little as possible, and administering it steadily. After the administration of the anesthetic he had found the administration of oxygen for fifteen or twenty minutes to be the most satisfactory of anything he had used. He objected to the use of morphia because there were so many cases of renal complications in which the use of morphia would handi-

cap the operator. Atropia was a valuable agent given before the administration of the anesthetic, but should be given during the administration of the anesthetic hypodermically in case mucous appeared in considerable quantities in the mouth and throat. He did not believe in washing out the stomach in these cases, because it was too irritating. He had tried this for a year and a half, and had abandoned it. He favored keeping the patient as quiet as possible. He raised his voice against the indiscriminate use of salt solution, as there were conditions in which the administration of salt solution was contra-indicated.

DR. BOISE, in closing the discussion, stated that, as to the vomiting center, it was said to be in the medulla. This had been sufficiently demonstrated, so that it was now accepted as a fact.

As to operating in the forenoon and afternoon, and whether there was any difference in the condition of patients, he had not paid any attention to that particularly, as bearing upon the question of vomiting, but it was a well-grounded opinion with his patients that they did better in all respects when operated upon in the morning rather than in the afternoon.

If one could obtund the sensitiveness of the vomiting center sufficiently long, the effect of the anesthetic would be largely eliminated. Again, one should endeaver to dilute as much as possible the anesthetic, so that its irritant action was to a certain extent lost. This could be done by the use of normal salt solution, or by the use of hot rectal enemata, etc.

REPORT OF THE COMMITTEE APPOINTED AT A PREVIOUS MEETING TO CONSIDER UNIFORMITY IN PELVIC AND CRANIAL MEASUREMENTS, WITH A VIEW TO OBTAINING A CONSENSUS OF OPINION THEREON BY OBSTETRICAL TEACHERS AND AUTHORS

This report, signed by Dr. A. F. A. King, Dr. J. Whitridge Williams, and Dr. Edward P. Davis, was presented by Dr. Williams. The main object in view was to construct a hypothetical or standard pelvis and head, which might be used for teaching purposes; such a standard pelvis and head being as near the typical normal head and pelvis of a living woman as the committee could construct. The relative size of head and pelvis was such as to secure or allow an easy and natural labor.

The definition of the "pelvic brim diameters" and of the "fetal head diameters" was the same as was adopted by the Section on Obstetrics of the Ninth International Medical Congress, held in Washington, D. C., September, 1887. To these had been added by the present committee, two diameters of the inferior strait, namely, the antero-posterior and transverse, and also the external measurements of the pelvis and a few others. It will be observed that the measurements as given in the English and metric systems do not agree with absolute precision, but they are sufficiently alike for all practical purposes. To have made them exactly similar would have required the use of very small fractions, which it was desirable to avoid.

External Measurements of Pelvis

	Ins.	Cms.
Intercrestal (between the most widely divergent points of the iliac crests).	11.00	28
Interspinous (between the two anterior superior spinous processes).	10.25	26.00
External conjugate (Baudelocque's, from the top of the symphysis pubis to the center of the sacral promontory.	8.00	20.50
External oblique (from the anterior superior spinous process on one side, to the posterior superior spinous process of the other).	8.75	22.50
Bitrochanteric (between the trochanters).	13.00	32.00

Measurement of the Pelvic Brim

Conjugata vera (between the middle of the sacral promontory and the point in the upper border of the symphysis pubis crossed by the linea terminalis).	4.25	11.00
Conjugata Diagonalis (between the middle of the promontory of the sacrum and the lower border of the symphysis pubis).	5.00	13.00
Transversa (between the most distant points in the right and left ilio-pectineal lines).	5.25	13.50
Diagonales obliques (between the sacro-iliac synchondrosis of one side and the pectineal eminence of the other).	5.00	12.50

Measurement of the Pelvic Outlet (Interior Strait)

	Ins.	Cms.
Antero-posterior (coccy-pubic—from the tip of the coccyx to the lower end of symphysis pubis). N.B.—The smaller figures are before the larger, after pushing back of coccyx).	3.75 to 4.25	9.00 to 11.00
Tranverse (between the tuberosities of the ischium bis-ischiatic).	4.25	11.00

Depth of the Pelvis

Anterior (from top to bottom of symphysis pubis in median line).	2.00	5.00
Posterior (from center of sacral promontory to tip of sacrum). Being a straight line between these two points. (A. F. A. K.)	5.00	13.00 12.50 (J.W.W.)

Measured on anterior surfaces, and not a straight line connecting the two points. (J.W.W.)

Measurement of the Fetal Head

Occipito-mentalis (from the tip of the occipital bone to the center of the lower margin of the chin).	5.25	13.00
Occipito-frontalis (from the occipital protuberance to the root of the nose).	4.50	11.50
Suboccipital bregmatica (from the point of union of the neck and occiput to the center of the anterior fontanelle).	3.75	9.50
Bi-parietalis (between the two parietal protuberances).	3.75	9.50
Bi-temporalis (between the two lower extremities of the coronal suture).	3.25	8.00
Trachelo-bregmatic (from the posterior angle of the anterior fontanelle to the anterior margin of the foramen magnum).	3.25	8.00

The measurements thus given were obtained in part by striking, not exactly an average, but a sort of *compromise* between the varying figures given by recent text-book authors; a further factor in the selection being an effort to arrange the measurements in the English and metric systems without resorting to diminutive fractions. In every instance the committee had endeavored to preserve those relative dimensions of the head and pelvis requisite for the normal mechanism of natural labor.

Should the measurements here reported be approved and adopted by the Society, it was suggested that the further step be taken of presenting the matter to the obstetrical section at some future meeting of the International Medical Congress for the purpose of getting it adopted as the standard head and pelvis for teaching purposes in other countries.

On motion, the report of this committee was unanimously adopted.

SYMPOSIUM ON THE RELATION OF THE APPENDIX TO PELVIC DISEASE OR TO PREGNANCY

The Relation of the Appendix to Pelvic Disease

Dr. Reuben Peterson, of Ann Arbor, Mich., said that as far as he could see he could not tell by mere inspection at operation whether the organ was diseased or not. In order to throw some light upon the question, clinical and microscopic observations were made on 200 appendices removed after the abdomen had been opened for distinct pelvic disease. He was unfortunately prevented from presenting the results of this investigation before the Society last year; but his paper was printed in full in the *Transactions*.

He took this opportunity of adding eighty-five cases to the two hundred already reported upon. He compared the results obtained in the two series of cases. Conclusions based upon the clinical and microscopic study of eighty-five appendices removed during the courses of operations for pelvic disease:

1. In the first series of two hundred cases a little over 50% of the appendices were found microscopically to be normal. In the present series, 49.3%, or practically 50%, were found normal. The same microscopic classification was adopted as last year, namely, (1) negative; (2) chronic inflammation; (3) doubtful significance; (4) former inflammation; (5) acute inflammation, and (6) periappendiceal inflammation.

The only change in the classification was that groups 1 and 3 were practically united, and with the exception of two cases were placed in the negative group. This was a minor detail of classification, however, as in each series the appendices in both groups were considered normal.

2. Thus, in both series practically one half

of the removed appendices were microscopically normal, while the remainder showed evidences of acute or chronic inflammation, or the results of former inflammation.

3. The average length of seventy-nine appendices was 9.99 centimeters. In the first series the average length was 8.25 centimeters.

4. The appendix was found adherent in twenty out of the eighty-five cases, or in 23.4%. This was 5% higher than in the last year's series. But both series showed that the appendix was adherent twice as frequently in those cases where microscopic examination showed past or present disease. A certain proportion of adherent appendices were, however, perfectly normal microscopically.

5. Abnormalities in shape were noted in twenty-seven out of the eighty-five cases. The appendices were found to be club-shaped, constricted, or bent upon themselves in ten of the twenty-seven cases, yet microscopically such appendices were normal. Hence the same conclusion arrived at last year held good for the present series: "Mere shape of the appendix cannot serve as an index of its normality or disease. Appendices may be club-shaped, constricted, or bent upon themselves, and yet be perfectly normal."

6. There were fecal concretions noted in fourteen out of the eighty-five cases. This gave a percentage of 16.4, and was double that noted last year. This might be explained by the more accurate observations made in the present series of cases. It did not take into consideration microscopic concretions, but only the palpable forms. In seven, or one-half the cases, the appendices with fecal concretions were normal, hence, as noted in the first series, their existence did not denote disease.

7. Exactly 50% of the thirty-four patients in the present series with chronic disease of the appendages showed accompanying disease of the appendix.

8. The following conclusion would hold good for both series: "In chronic disease of the appendages, adhesions of the accompanying appendices are present in nearly 50% (47% second series) of the cases where microscopic examination shows the latter to be diseased. In a certain proportion of cases, however, although the appendix may be adherent, it is also perfectly normal.

9. "Of the seventeen normal appendices accompanying chronic disease of the appendages, nine were noted as changed in shape, or contained fecal concretions, hence in chronic disease of the appendages, the appendix which is club-shaped, constricted, or contains fecal concretions, is not necessarily diseased."

10. There were twenty-one cases of uterine fibromata among the eighty-five patients. Of these, 48% had accompanying disease or evidence of former disease of the appendix. The percentage was in the first series practically the same.

11. There were eight cases of large ovarian cystomata in the second series. Of these, 50% had accompanying disease of the appendix, 20% less than in the first series.

Thus, with the exception of a few unimportant details, the results of the investigations were identical in the two series of cases. A great many appendices which looked diseased were shown microscopically to be normal, and *vice versa*. He could not agree with the dictum that we should not remove the appendix as a routine procedure, because we did not as yet know the function of this organ; hence he saw no reason for changing the opinion expressed last year: "Since it is impossible for the surgeon by gross appearances alone to determine which appendix is diseased, and since nearly 50% of appendices, where the abdomen is opened for other purposes, is found microscopically to be diseased, it is the surgeon's duty, in the absence of contra-indications, to remove the appendix in every case; otherwise he will leave behind diseased appendices which may prove a subsequent source of suffering to the patient."

Inflammatory Conditions of the Appendix Accidentally Brought to Light in Pelvic Operations

Dr Hunter Robb, of Cleveland, Ohio, read a paper with this title. In a fairly long series of abdominal operations—some 370—he had made it a routine procedure to examine the appendix vermiformis, and where this organ seemed to be diseased and the condition of the patient seemed to warrant the procedure, he had been in the habit of removing it. In the first place, the microscopical appearances were far from being trustworthy in every case. Thus, in quite a number of the instances in which to him at the time of the operation the appendix appeared to be diseased, microscopical examination failed to show any signs of inflammatory change. On the other hand, in a measure, the converse was also true. When he found that the appendix, the tubes and the ovaries were all diseased, the question arose: In which of these structures did the process begin? Not a few operators were of the opinion that an inflammation in or about the appendix could and not rarely did spread to the tubes and ovaries. They held that in many instances a perforation of the appendix took place, and that the accident led to an inflammatory involvement of the lateral

structures; but that the perforation having healed, the appendix gave no further trouble, and at operation looked perfectly normal, while the secondary effects remained. It was hard to believe that such instances were very common, and certainly one was not justified in accepting such a conclusion for any given case unless a microscopical examination had clearly shown that a perforation had at some time taken place. So far as his own experience went, in over one thousand abdominal sections for pelvic disorders he had failed to find positive evidence that in a single case the appendix had been the primary seat of the disease.

So far as the differential diagnosis between a more or less acute appendicitis and an inflammation of the lateral structures was concerned, the problem, as a rule, was not difficult. If a history of a gonorrheal infection or pelvic disturbances following labor or abortion could be elicited, and bi-manual examination showed some abnormal enlargement in the region of the adnexa, the morbid condition, or at least the predominating lesion, could with safety be decided to exist in the tubes and ovaries.

Whether in all cases in which the appendix was found flexed or firmly bound down by adhesions, we were dealing with a pathological condition which must almost inevitably cause trouble at some future time, was a question that could not always be answered. It would seem, however, fairly certain that such conditions were not always of special significance. Nevertheless, in these cases he did not see the use of taking any unnecessary chances, and provided that the patient was in a satisfactory condition, and would not be exposed to any risk by a slight prolongation of the operative procedures, it was his custom to remove the appendix whenever the abdomen was opened for other reasons.

Of the 370 appendices removed and examined microscopically, 103 were normal, 46 showed signs of a chronic, and one of an acute, appendicitis. In 88 cases there was an hypertrophy of the subperitoneal or internal coat, or of both coats. In 66 cases the changes were of doubtful significance; in 36 the lumen was occluded; in 16 dilated; in 12 the appendix contained concretions; in 1 case the appendix was cystic and had undergone myxomatous degeneration; in one case no lymphoid tissue was present.

CONCLUSIONS

"1. In a large number (in our series in 323 out of 370) of pelvic cases no inflammatory changes in the appendix were found even microscopically.

"2. When we find a normal appendix in conjunction with disease of the pelvic organs, it is improbable that the latter condition has been brought about by a perforation of the appendix which had afterwards healed.

"3. On the other hand, an old periappendicitis and adhesions might often be looked upon as the result of a septic infection, originating in and spreading from the organs of generation.

"4. An appendix which looks abnormal microscopically does not always show inflammatory changes on microscopical examination.

"5. Nevertheless, when the removal of the appendix adds very little to the gravity of the abdominal operation, for the benefit of the patient it should be taken away.

"6. In our series of 370 cases there were four deaths, but a careful analysis goes to how that the fatalities could in no instance be attributed to the removal of the appendix."

DR. HENRY C. COE, of New York, contributed a paper entitled THE RELATION OF APPENDICITIS TO PREGNANCY, which was read by the Secretary in the absence of the author. (This paper appears in this issue of the Journal. See page 53.)

DR. A. LAPTHORN SMITH, of Montreal, read a paper on APPENDICITIS IN RELATION TO PELVIC DISEASE AND PREGNANCY.

The human body is the most complicated piece of machinery that has ever been constructed, and were every part used as nature intended it to be, there would be no weakest part and it would go on working much longer than it does. But unfortunately owing to changes from the natural to the artificial modes of life there are some parts of it less used than others, and these parts become the weakest ones.

Owing to our present methods of living the vermiform appendix is the least used part of the human mechanism.

An organ which is weak even in the healthiest, must be still weaker in the unhealthy. Who are the unhealthy? Those who are deprived of fresh air, sunshine, proper food, and exercise.

For in all of them the appendix is on the verge of decay, and only waiting for a temporary increase in the number of colon bacilli, for it to be attacked with ulceration, perforation, and gangrene. When the heavy and badly nourished appendix drops into the pelvis and touches the infected tube, adhesions are formed which we so often find attached to the latter when we are operating for its removal.

During pregnancy the digestion, which may have

been outraged for years, breaks down completely and the appendix is then worse nourished than ever, so that with all due conservatism the writer feels convinced that in all operations for pelvic disease the vermiform appendix should be suspected, examined, and if found guilty, removed. And women who are known to have appendicitis should be urged to have it removed before marriage, or at the latest before the third month of pregnancy, if it causes trouble. While the writer does not wish to go quite as far as that, still he thinks that it is a question worthy of discussion whether it would not be better to remove the appendix at a time when there would be no death rate, from these women who are almost certain to require its removal sooner or later, and in whom a late operation gives such a high mortality.

Dr. J. Clarence Webster, of Chicago, contributed a paper on Appendicitis in its Relation to Pregnancy. (This paper appears in this issue of the Journal. See page 27.)

DISCUSSION

Dr. Seth C. Gordon believed that the appendix was practically a useless organ. No physiologist, no pathologist, had found any use for it. His invariable rule had been for a considerable time, whenever he opened the abdomen for any other purpose, to remove the appendix, whether good, bad, or indifferent, as it was, when he removed the tubes and ovaries for any purpose, to take away the uterus with them. Conservatism was that which conserved the health of the patient.

Dr. Frederick W. Sears, of Syracuse, New York, by invitation, stated that one should not be fearful about operating upon pregnant women for appenditicis, as his experience had been that pregnant women bore operation better than the non-pregnant. He had seen no trouble in operating on them, if proper preliminary preparation was given for the operation and as little of the anesthetic as possible used. His experience in operating on pregnant women for appendicitis had been confined to three cases.

The first patient, advanced in pregnancy about the third month, was seen at the stage of beginning gangrene of the appendix. A small amount of drainage was used. The patient, in spite of adverse conditions, went home and in due time was delivered of a child without the slightest difficulty.

The two other cases were reported, upon whom operations for appendicitis were performed during pregnancy, and both made good recoveries from the operation, and were subsequently delivered without any untoward results.

Dr. Andrew F. Currier said he was glad to participate in this discussion, because he presumed he would take an unpopular side. Certainly, he was obliged to differ from Dr. Gordon. He did not believe that it was good surgery to remove any organ of the body which he was not convinced was diseased. Of course, in certain cases in which there was a strong probability of malignant disease, an exception could be made, but with that exception, the function of the surgeon was to preserve rather than destroy, to build up rather than to remove. A great deal had been said in regard to the uselessness of the appendix; but he would like to ask Dr. Gordon where he got his proof that the appendix was a useless organ. Certainly not in the fact that the fecal current did not circulate through it, for it certainly did in some cases. He had seen it. It had lymphoid tissue, and it possibly assisted in the digestion of the food. As to that, however, he was unable to say. On the other hand, he could not say that it did not.

The testimony of the first two papers which were read, if it proved anything, would lead him to the very opposite conclusions from those drawn by the readers of the papers. In both of those papers there was an account of fifty per cent of cases, or of a large series of cases, in which microscopic examinations were made and nothing pathological was found in those organs, and yet the conclusion was drawn that because there might be trouble in the future, the organ (the appendix) should be removed. He did not think this was a logical conclusion. The question at issue was whether operators were going to benefit patients more by removing these organs than by letting them alone. The Society should aim to strike a higher note, and look upon this subject purely from its scientific aspect rather than from any sentimental point of view, or from talk which might obtain among the laity.

Dr. Clement Cleveland said, believing as he did that the theory of evolution was indisputable, he had looked upon the appendix as a useless organ. There were a great many surgeons to-day who took this radical view in operating for intra-abdominal conditions of removing also the appendix. In cases where the appendix had been removed on account of inflammation or disease, the rule was that the patients had vastly improved; that their general condition was better; digestion was far better. He thought this was almost universal. In cases where the appendix had not been found

diseased, but still had been removed, there was no history to show that any harm had come to the patients. One might say that the effect had been *nil*. Certainly, in cases where he had removed the appendix, he had not seen any harm come to the patient. It was his habit, in opening the abdomen, before he did anything else, to look for the appendix and anchor it by passing a thread of catgut through the distal end of the meso-appendix, anchoring it with a pair of forceps thrown over the side of the abdomen, so that he could come to it, after the other operation was completed, if the patient was in a condition for further procedure. He had been following this practice for a number of years, and he saw nothing to deter him from continuing to do so. The arguments of Dr. Currier did not appeal to him. He felt the appendix was useless, and history showed that after its removal no harm came to the patient who had lost it. In fact, he thought the testimony would be in the other direction.

Dr. Fernand Henrotin entered a protest against some of the views advanced, based upon a reasonable amount of experience in cases of that kind, where the appendix, when not removed, gave rise to trouble afterwards. There was very little doubt but what Dr. Cleveland was correct, namely, that so far as clinical observation was concerned, the appendix was not only responsible for inflammatory attacks, but likewise responsible for a good deal of indigestion, colic, dyspeptic symptoms, and trouble in the abdomen which was never accurately diagnosed. And the result, as stated, was apt to follow. After an operation for its removal, patients were less affected. It had been his fortune to see three striking cases; two of them he had operated upon personally. The third case was one upon whom the late Dr. Tuttle had operated for a fibroid eight or ten months previously. In this case Dr. Tuttle had the appendix in hand, and made the remark what a nice, clean appendix it was. He left it. Six weeks ago the speaker operated on the patient for an acute attack of appendicitis. In another case he operated for the removal of an ovarian cyst about three years previously. This patient had a cyst on the right side, and a second one on the left. She was taken sick at six o'clock in the evening, with severe pain in the right side, which was so intense all night that she had to be given a hypodermic injection of morphine. In the morning the speaker operated, in spite of the patient being quite ill, found the abdomen very tense, the appendix had ruptured, and considerable pus had escaped during the night. A grape seed was found in the middle of the appendix, and had produced appendicular colic, constant distress and pain. He would remove the appendix in every instance unless there were contra-indications to its removal.

Dr. Herman J. Boldt said the idea of being able to palpate the appendix, as promulgated by some confrères, in every instance, he thought was erroneous. There were many instances of appendicular disease where it was impossible to make any satisfactory diagnosis except that one might suspect that appendicitis was present. Quite recently a woman, pregnant about the fourth month, had a number of attacks of acute pain in the abdomen. Upon bi-manual examination under ether, it was impossible to determine anything definite, but because of the extreme pain he determined to open the abdomen. He did so, and found an appendix about six inches long, curled upon itself, in a state of acute inflammation. Since its removal the woman had been well.

He related another similar case. In this there was an accumulation of pus found in the terminal part of the appendix which was strictured. He could relate a number of instances where, on removing the appendix, and getting it under his eye, and after making a microscopic examination, he found there was distinct evidence of subacute appendicitis. He was not only referring to the catarrhal, but to the acute form.

Dr. James F. Baldwin, of Columbus, Ohio, by invitation, stated that for the last eight years he had been making it a routine practice to examine the appendix in all cases when operating for other intra-abdominal pathological conditions, and had practically removed this organ in all instances, and he was glad to hear the testimony in favor of examining the appendix and removing it practically in all cases. Out of 3,000 abdominal sections he had removed the appendix 1,800 times. Two or three years ago he reported in the *Cincinnati Lancet-Clinic* a study of between six and seven hundred appendices which were thus treated. He was sorry that he had not a copy of the paper with him, but about ten per cent of the appendices seemed to be healthy. In all the other cases the organ was constricted, twisted and contained foreign bodies. In one case it contained the traditional grape seed, the only case he had ever seen. He was led to adopt this method of treatment because of several cases he had operated on himself and many cases by others in which he was obliged to remove the diseased appendix after an

abdominal section had been made. It seemed to him that the risk these patients ran in being subjected to a second section was greater than the added risk of a thousand incidental removals of this organ. None of the appendices he had removed had been examined microscopically, for the reason that he did not excise them, but inverted them.

Dr. Edward P. Davis, of Philadelphia, said there were special reasons why appendicitis should appear in pregnant women and why the appendix should be removed if it gave trouble. Any condition of the intestinal tract during pregnancy which in the slightest degree lessened the peristalsis of the normal intestine predisposed to infection with the bacillus coli communis. There might be infection in the adnexa, the uterus, or the appendix. On the other hand, a pregnant woman, whose metabolism was well maintained, was in good condition for a surgical procedure, because she had a physiological blood plethora. She bore anæsthesia well, etc. The removal of the appendix, therefore, was applicable to pregnant women, and need not be delayed until after delivery. It was much safer to do the operation during pregnancy than to let the woman run a risk. Any inflammation which extended from the tissues at the side of the uterus might complicate a woman's labor afterward. He recalled one case in particular in which there was a catarrhal condition of the appendix and intestine, which persisted, and where operation could not be done; the uterus acted during labor; it was a shoulder presentation and the child was lost in a difficult version, showing that inflammation at the side of the uterus might limit the mobility of this organ in labor and indirectly bring about complicated labor.

Dr. Arthur W. Johnstone said that his experience with regard to appendicitis was limited to four operations on pregnant women for this disease between two and a half and four months. All recovered. There were no miscarriages.

He said he would not hestitate to remove any appendix when operating for some other purpose.

Dr. Malcolm McLean said he had not yet arrived at the point where he would remove an organ simply because it might in the future give trouble. One might as well remove the mammary gland, for instance, of a woman simply because carcinoma might develop in it later and destroy life. He believed it was bad surgery to remove an undiseased appendix when operating for some other intra-abdominal condition. He would not do it.

Dr. Ely Van de Warker saw no reason why if a perfectly healthy appendix was encountered when one was operating for some other purpose, it should be removed for fear something was going to happen to it.

Dr. J. Riddle Goffe said there was a time when the profession did not know the function of the spleen, but it was not taken out because the abdomen was opened for some other purpose. We might wake up to the fact some day that the appendix had a function, and no doubt we would sooner or later. He thought there was positive danger in removing a healthy appendix, and he did not believe any surgeon was justified in so doing.

Dr. Philander A. Harris thought that one should never fail to inspect the appendix, and if diseased, and the condition of the patient would permit, it should be removed.

He had had one case of insufficient hemostasis in the meso-appendix, where if he had not opened the abdomen about eight or nine hours afterward, the young woman would have bled to death. He would raise his voice strongly against removing perfectly healthy appendices unless there was lots of time to do it, or unless patients desired it.

Dr. H. J. Lipes, of Albany, thought the appendix had a decided function, and it was this: It was composed largely of mucous glands, and in the lower part of the cecum there was no more stagnant portion of the intestinal tract, and no portion that needed lubrication more to get rid of the fecal material than it, and he thought the mucus which was secreted helped digestion.

May 26th—Second Day—*Morning Session*

Symposium on the Radical Abdominal Operation versus the Vaginal Operation for Carcinoma of the Uterus.

Dr. C. C. Frederick, of Buffalo, N. Y., read a paper with this title, in which he summarized as follows:

1. The radical operation for carcinoma of the uterus should be done only when gross lesions can quite certainly be diagnosed as confined to the uterine tissue.

2. The deeper tissues of the cervix are gener-

ally invaded first, and also the deeper layers of the vagina in the immediate vicinity of the cervix are infected before the disease appears upon the mucous surface.

3. The bladder wall is very early infected, especially when the anterior lip of the cervix is the starting-point of the growth.

4. When pain becomes a prominent symptom, the growth has passed beyond the uterine tissue. Such an involvement is a positive contra-indication to a radical operation.

5. Carcinoma of the body presents an entirely different condition. In these cases the liability of extra-uterine lymphatic infection is less for the same period of growth.

6. When the radical operation is done, it is necessary to remove as much of the vaginal walls and pericervical tissues and broad ligaments as possible.

7. It is a well-attested fact, that in most recurrences after hysterectomy, the growth is found in the cicatrix and the adjacent vaginal tissues.

8. In view of the point at which recurrence begins, removal of the pelvic lymphatics and glands therefore does not insure against recurrence.

9. If the vagina is ordinarily capacious, and if the uterus can be drawn down, it would seem that the vaginal route is naturally the one by which the operation can be most readily and thoroughly done.

10. It is possible, yes, probable, that some cases of recurrence are due to the infection of the freshly incised tissues at the time of operation, by contact of the carcinomatous mass or its fluids. By the vaginal operation, this may to a great degree be prevented by removal of the cancerous mass, or by thoroughly cauterizing it before beginning the operation proper.

11. The operation can be more quickly done than by the abdominal route.

12. Convalescence, after vaginal operations, is much more rapid; there is much less pain, and there is much less shock to the nervous system.

13. For the cervical carcinoma, in most instances the combined clamp and cautery operation seems to be the preferable one.

14. Undoubtedly infected areas are reached and rendered harmless by the free use of the cautery in this operation.

15. The vaginal walls and all tissues should be seared by it, except those at the utero-vesical junction. The writer would therefore limit the abdominal operation to those patients in whom the condition of the vagina or immobility of the uterus makes the vaginal operation practically impossible.

Dr. George Gellhorn, of St. Louis, Mo., read a paper entitled Paravaginal or Abdominal Operation in Carcinoma of the Uterus.

The author limited his remarks to the operative treatment of cancer of the cervix, first, because cancer of the cervix is about sixteen times more frequent than cancer of the body of the uterus; second, because the operative results had been thus far highly unsatisfactory, and called most urgently for speedy improvement. Under the term cancer of the cervix he included carcinoma of both the vaginal portion and the cervix proper, since in most statistics no distinction between these two forms had been made. Moreover, in many instances, the point of origin could no longer be determined.

A decided step toward an amelioration of the existing conditions seems to have been inaugurated in 1900, when Wertheim revived the operation originally devised by Reis, in 1895.

The radical abdominal operation included the extirpation of the uterus and appendages together with the excision of the parametria and a large portion of the vagina, and introduced as an absolutely new feature the routine ablation of the lymphatic system of the pelvis. The last-named point was based upon the assumption that in cancer of the uterus the pelvic glands soon became infected and that in consequence of this early and widespread involvement the glands, when left behind, would keep up the destructive disease, thus frustrating the effects of operations.

To investigate the correctness of such views, the following tables were prepared. Into these tables only those cases could be admitted that were subjected to microscopic examination, because it was known from numerous investigations that the glands might be enlarged without being carcinomatous, while small and apparently normal glands might contain cancer.

Table Showing the Percentage of Glandular Involvement in Carcinoma Uteri, Irrespective of Location

		Per cent
Wertheim-Kundrat	(80:26)	33·7
Doederlein	(115:26)	22.8
H. W. Freund	(15: 4)	26.6
A. v. Rosthorn	(33:19)	57·5
Koenig	(7: 0)	0.0
Mauclaire	(6: 2)	33·3
Kleinhans	(32: 9)	28.0
Zweifel-Glockner	(59:11)	18.1
Schauta	(10: 2)	20.0
Oehlecker	(7: 2)	28.6
Total	(364:101)	27·7

Table Showing the Percentage of Glandular Involvement in Cancer of the Cervix

		Per cent
Wertheim-Kundrat	(76:22)	28.9
Doederlein	(92:24)	26.0
Manteufel	(33: 9)	27.3
Sampson	(15: 6)	40.0
Total	(216:61)	28.2

These 27.7 and 28.2 per cent respectively, were derived from cases which had been subjected to the abdominal operation, and although they seemed to be surprisingly low, yet, they were corroborated by the but slightly higher percentage as found by the pathologist upon the post-mortem table. Riechelmann, for instance, had in 86 cases, of whom there were 72 inoperable ones, only 30 cases of glandular involvement, i. e., 34.9 per cent.

On the other hand, extensive metastases in the glands might occur in the incipient stages of cancer. Such cases had been reported by Tiburtius, Ries, H. W. Freund, and others, but instances of this sort were rather rare, and it might safely be assumed that glandular involvement took place only in the more advanced stages of the disease. This was also proved by the results after simple vaginal hysterectomy. In this operation no glands were removed, and yet a certain percentage of patients remained free from recurrence. In about three fourths of all cases, recurrence became evident in or near the scar in the vagina, and only in one fourth in the glands. Cervical cancer affected the pelvic glands only in less than one third of all cases, and that the invasion practically did not take place until the parametria were completely infiltrated. The next deduction was that two thirds of the cases did not require the removal of glands incident to the radical abdominal operation. In about 66 out of 100 patients, this part of the operation was unnecessary, nor was it possible to make a definite determination before or during operation. Palpation of enlarged glands was not feasible before operation, and was, even after opening the abdomen, frequently impossible. All these difficulties would force upon us the risk of doing an unnecessary operation in two thirds of the cases, in order to satisfy the principle of removing glands. In a hopeless disease like carcinoma, the most heroic measures might be justified, provided the harm done did not outweigh the possible benefit to be derived. Thus, the propriety of routine ablation of glands would depend upon the following four points:

1. Mortality.
2. Morbidity.
3. Completeness of the operation.
4. Late results.

Table Showing the Immediate Mortality of Radical Abdominal Operation

		Per cent
v. Rosthorn	(33: 3)	9.9
Kleinhans	(32: 3)	9.3
Zweifel-Glockner	(59: 6)	10.2
Kroenig	(8: 1)	12.4
H. W. Freund	(15: 2)	13.3
Wertheim	(120:20)	16.6
Hofmeier	(18: 3)	16.6
G. Klein	(16: 3)	18.7
Mackenrodt	(32: 6)	18.8
Sampson	(15: 3)	20.0
Doederlein	(34: 7)	20.6
Pozzi	(43: 8)	23.5
Spienelli (*Italian Statistics*)	(200:52)	26.0
Pozzi (*French Statistics*)	(95:26)	27.4
Kuestner	(56:17)	30.4
Jonnesco	(28: 9)	32.1
Martin-Heinsius	(16: 6)	37.5
Total	(812:175)	21.5

This average mortality of 21.5 per cent was rendered even more discouraging if we remembered that only in one third of the cases the ablation of glands with all its dangers had been necessary.

As regards morbidity, Kermauner and Laméris report that of the 33 cases of v. Rosthorn, only 14 had an undisturbed convalescence. Accidental injuries to the bladder and ureters were most to be dreaded, and the various complications were the more distressing as the patients, in most cases, were in a poor condition from the effects of the primary disease.

Only about one third of those cases which generally were considered operable were the pelvic lymph glands involved. To remove indiscriminately these glands in every case would mean to subject the remaining two thirds to an unnecessary operation. Yet we possessed at present no positive method to distinguish cases with affected glands, from those with normal glands. The ablation of glands was fraught with considerable danger, which increased proportionately to the extent of their removal. The extirpation of glands was almost always imcomplete. Where carcinomatous glands were removed, other equally involved glands were almost certain to be left behind, both for anatomical and technical reasons. Because of this, the remote results of the extirpation of glands had thus far failed to come up to

the expectations raised. Consequently, the systematic search for, and routine ablation of, the pelvic glands in carcinoma of the cervix-uteri should be abandoned.

The operability with the paravaginal method was, on the whole, identical with that of the radical abdominal operation and ranged from forty-four to fifty-six per cent of the cases examined. The number of the author's own cases being too small, he had compiled a table showing the immediate danger to the life of the patient.

Table Showing the Immediate Mortality after Paravaginal Operation

		Per cent
Schuchardt	(83: 8)	9.6
Schauta	(91:11)	12.0
Staude	(51: 9)	17.6
Total	(225:28)	124.

This table showed that the mortality with Schuchardt's method was proportionately not high; nor was the morbidity excessive. The number of accidental injuries was small. Schauta had in 121 operations only 12 injuries—10 per cent. As far as the remote results were concerned, Schuchardt obtained a permanent cure five weeks after the operation in 40 per cent of the surviving cases. This meant already an improvement of 11 per cent over the old vaginal extirpation, and further improvement would be derived from increased personal skill and judicious selection of cases for operation.

The development of igniextirpation was most intimately connected with the names of Mackenrodt and Byrne. Mackenrodt in particular obtained with this method results which rank among the best ever achieved by any other method. The principal effect of igniextirpation was the prevention of implantation.

Theoretically, combined paravaginal operation and igniextirpation promised results which might excel the best thus far obtained.

CONCLUSIONS

1. The object of this symposium is to discuss how we may improve our operative technique in order to better our results in uterine cancer.

2. The following conclusions apply only to cancer of the cervix-uteri.

3. The radical abdominal operation, as far as the routine ablation of the lymphatic organs of the pelvis is concerned, has thus far failed to yield the desired results.

4. On the other hand, the eradication of the parametria has been found to reduce greatly the percentage of cures.

5. Consequently, the simple abdominal and vaginal operations which do not include this procedure, must be discarded.

6. For the extirpation of the parametria, Wertheim's method is the best of the abdominal operations.

7. It has, however, I believe, certain disadvantages compared with the paravaginal method of Schuchardt.

8. Considering the encouraging results of igni-extirpation, a combination of thermocautery with paragavinal extirpation gives promise of further improvement in operative results.

DISCUSSION

DR. FERNAND HENROTIN said that he wished to put himself on record to this extent that with a better knowledge of handling the case, with a better knowledge of the technique, with more experience in handling the parts, after doing the operation a good many times, the vaginal operation was apt to succeed more frequently than we had supposed. After many discouraging experiences with the abdominal operation, attended as it was with shock and such large mortality, he had done but few such operations lately. The removal of the uterus through the vagina succeeded in some cases that were apparently beyond help.

DR. A. LAPTHORN SMITH believed that many cases of recurrence of cancer were due to infection of raw surfaces made by the scissors and knife in operating. This was a point in favor of the Byrne method in making division through the tissues by means of heat to prevent infection.

DR. HENRY T. BYFORD had performed the abdominal operation frequently. When the iliac glands toward the side of the pelvis were affected, there was infiltration of the connective tissue about the cervix. This process occurred early, and at the time these glands were affected, if removed, one did not get rid of the infected connective tissue, particularly the infected connective tissue next to the bladder, or if the tumor or disease started behind next to the rectum. Therefore, the field for the abdominal operation he thought was restricted; and as the mortality was great, he considered that this operation was not well established, and could not be unless statistics became more numerous than they were at present, and he believed there would be a sacrifice of many lives to show that the operation was justifiable.

DR. HERMAN J. BOLDT said the results of extirpation of the uterus for cancer must be viewed from several standpoints. First, the location of the disease; second, the age of the patient. As to location of the disease, a distinction must be made between cancer of the cervix proper and cancer of the vaginal portion. We realized that in carcinoma of the cervix proper, the parametria were involved much earlier than in any other location by the malignant neoplasm. In cancer of the vaginal portion the vagina was involved more frequently than any other parts by the neoplasm. As to the age of the patient, the younger the patient, who was infected with the disease, the greater the rate of mortality, or recurrence of the disease, when operated upon. As to the relative value of the two operations, he did not believe the abdominal operation was going to make up the statistics, because there was a greater rate of mortality resulting from it than from the vaginal method.

DR. REUBEN PETERSON thought most of the members were displeased with the results they had obtained from the older methods of operating for carcinoma of the cervix. He had endeavored, like others, to take out the uterus by the vaginal method, and removing as much of the parametrium as possible, yet the patients died after a longer or shorter time; consequently he considered carefully the feasibility of the radical abdominal operation. *A priori*, he considered the question with disfavor. Could one remove all of the glandular tissue in the pelvis that was involved? Could one go outside far enough to overcome the great increase in mortality which was sure to result from the radical abdominal operation? From his experience with the radical operation for carcinoma of the breast, although the cases were not strictly analogous, he thought it was his duty in this class of cases to try and see if something more could not be done, and so within the last two years he had tried in certain cases, the radical abdominal operation. He had operated upon two women who should not have been operated upon. He had done six of these operations. Two of the women died from shock, on the operating table, or shortly after they were removed to their rooms. The other four had lived, and the time was too short to say anything in regard to the outcome of the operation in these. One must look at the subject from a number of standpoints, and even though one may not remove all of the infected glands, still he could get farther outside by the radical abdominal operation, and was working along possibly proper lines.

DR. A. PALMER DUDLEY said that those who had seen the return of cancer per vaginam after removal, found that it returned in the anterior wall of the vagina in the tissues between the bladder and the vagina, and in such a return one had but little to remove or remedy except a fistula. He believed in the combined operation, using the cautery for severing the vaginal connections of the uterus, and then opening the abdomen for the removal of the glands.

DR. ANDREW F. CURRIER thought the outlook and the present condition of this subject were sad, and as hopeless as they ever had been, and what we could expect from surgery in the solution of this question, he failed to see. Was there anything more that could be done in the way of the removal of the diseased tissue from the pelvis in those affected with cancer? Surgeons had not only removed diseased organs, but the pelvic glands; they had tied the iliac arteries; they had removed the parametria, and he did not see what more they could do. The surgical treatment of cancer, so far as effecting a cure was concerned, was a failure. He did not mean by this, however. that surgeons should cease operating upon those who had cancer. The greatest hope of effecting a cure came from seeing and operating on the cases very early.

DR. WILLIAM H. WATHEN said that the therapeutics of cancer of the uterus had not been encouraging, nor was the therapeutics of the treatment of cancer in any part of the body encouraging. It was to be hoped that the laboratory might enable us to prevent cancer of the uterus, and of other parts of the body, by discovering some means by which it might be controlled without surgical intervention. In the meantime, however, we must contend with the condition that necessarily confronted every gynecologist and surgeon, and must decide as best we could on a surgical procedure that would result in the least immediate mortality, and that would prolong the life of the patient best.

DR. REUBEN PETERSON, of Ann Arbor, Michigan, read a paper entitled MIGRATORY UTERINE FIBROIDS.

Twenty cases had been collected and abstracted from the literature.

As to the causes of migratory fibroids, it was evident that a subperitoneal growth with a broad base could not be either thrown off or twisted from the uterus. Such a nodule without a pedicle and only slightly adherent to the

uterus might become adherent to other organs, and then subsequently separated from the uterus. Especially would this be the case if the nodule were connected with a uterus which was rapidly rising in the abdomen because of pregnancy. In the large majority of cases separation only occurred in pedunculated growths through atrophy resulting from twisting or compression of the pedicle. Ovarian cysts were almost always pedunculated, and it was equally true that twisting of the pedicle was far more common in such cysts than was the case with fibroid growths. Moreover, migratory ovarian cysts were more common than were sequestrated fibroid growths. Of the 20 collected cases of migratory fibroids, 7 were quite free and loose in the pelvic cavity. In 11 cases the growth was attached to various pelvic and abdominal structures from which it received its blood supply. One tumor was connected with the anterior abdominal wall, and in one instance the appendix was attached to the growth. One tumor had broken away from the uterus and was attached high up in the abdominal cavity near the diaphragm. In three cases the nodules were attached to the omentum and received their nourishment from the vessels of the latter. Eight, or nearly one-half of the twenty tumors, showed evidences of calcification. Five of these calcified nodules were adherent to other structures, while the remaining three were quite loose in the peritoneal cavity. These calcareous changes could take place before or after the severance of the pedicle, although the high percentage of calcareous changes among the migratory fibroids would lead to the inference that severance from the uterus increased the tendency to calcification. There were only three calcified tumors among the 16 cases of fibroids with twisted pedicle collected by Bernard. The size of the tumors was mentioned in 12 out of 20 cases. It was usually stated that these migratory fibroids were small and hardly ever reached the size of an egg. This statement was not borne out by a study of the present series of cases. The tumors varied in size from a hazelnut to one weighing 15 kilograms.

The writer's first case showed the great friability of the pedicle in certain pedunculated fibroids.

CASE 1. An irregularly shaped subperitoneal fibroid, the size of a fist, attached to the uterus by a very slender pedicle. The pedicle was very friable and broke away from the uterus during the latter's removal. The omentum was attached to the posterior surface of the fibroid and partially nourished it.

A twist of the pedicle was not essential to the formation of adhesions of a subperitoneal pedunculated fibroid to other structures. In the case above, the large part of the tumor's nourishment was derived from the omental vessels, as shown by the absence of bleeding when the pedicle was torn off during the removal of the uterus. A sudden twist of the pedicle in this case would have caused few, if any, symptoms. The pedicle would have soon atrophied, and the tumor would have left the uterus and be nourished by the omentum.

CASE 2. Subperitoneal uterine fibroid, the size and shape of a normal kidney, connected with the uterus by a narrow pedicle twisted once on itself. The tumor was situated on the right uterine horn, although the pedicle came from the other horn. The tumor was also attached to the bladder, pelvic peritoneum, omentum and appendix.

The adhesions in this case were necessarily secondary to the torsion, for it would have been an utter impossibility for the twist to have been secondary. The resemblance in size and shape of this tumor and one reported by Gill Wylie to a kidney was of importance, and should be borne in mind in the differential diagnosis of pelvic tumors. The fact that the appendix was adherent to the tumor was not surprising, when one considered the frequency with which the appendix was situated in the pelvis in the female. Just as was the case with ovarian cysts, the degree of twisting of the pedicle of a subperitoneal fibroid might vary within wide limits. Bernard reported a case where the pedicle was twisted seven times about itself. The tighter the twist, the greater would be the interference with the blood supply of the growth, and more quickly would the separation of the tumor occur. Among the causes of torsion of subperitoneal uterine fibroids he mentioned the force of gravity due to unequal development of different parts of the growth causing a falling toward the heaviest side. Alternating filling and emptying of rectum and bladder were assigned as causes. Movements of the patient, and contraction or relaxation of abdominal walls probably were the most common causes of twist of pedicle.

CASE 3. A hard, smooth tumor, the size of an orange, unattached to the uterus, having all the characteristics of a subperitoneal fibroid, surrounded on all sides by the omentum and nourished entirely by the omental blood vessels.

As regards the diagnosis of this tumor, the nature of the abdominal mass was not suspected. It was thought that the tumor might be a floating kidney. The possibility of migratory fibroids should be considered where there were no signs

of malignant disease, and a mass, separated from the uterus, containing fibroid nodules, presented none of the characteristics of other organs.

The objection might be raised that no direct proof had been advanced that the last described tumor was at one time connected with the uterus. The presence of muscular tissue in a growth so situated was almost proof positive of its uterine origin. It was not a tumor of the omentum, but the latter evidently was merely attached to its surface, and did not penetrate its substance.

According to Warthin, there was no proof that fibromatous tumors ever arose from the omentum. The omental fibromata described were probably the result of fibroid thickening, and not true tumors. Where the growth was situated within the pelvis, unattached to the uterus, proof that it was from the latter organ became more difficult because of the possibility of the growth having originated from fibro-muscular tissue of the round, utero-vesical and utero-sacral ligaments. Sometimes the finding of a cicatrix upon some portion of the uterus would increase the probability of the tumor's uterine origin. It was possible for a uterus, the seat of a fibroid growth, to be twisted about itself. Schultze had collected 32 such cases. In 15 the twisting of the uterus was associated with fibromata, while in 17 ovarian cysts were present. The uterus might be stretched out by the growing tumor; then, if a torsion occurred, the cervix at the level of the vagina would be twisted into a mere string, and the uterine cavity obliterated at this point. A number of such cases were reported in Schultze's article. Ricard had even reported a case where the uterus was completely severed at the cervix by torsion, and the uterus and tumor were only held there by a thin string formed by the serous folds which were twisted upon themselves. While this was apparently an unique case, it showed the possibility of torsion of the uterus under certain conditions. Such a mass could contract adhesions with adjacent structures, and simulate almost exactly true migratory fibromata.

Dr. Chauncey D. Palmer, of Cincinnati, Ohio, mentioned a case of migration of uterine fibroids that occurred in his practice at the Cincinnati Hospital twenty years ago. The patient was a colored woman, in whom these tumors most frequently occurred. She came into the ward one day, and died the next day from sepsis, and from hemorrhage which she had for a long period of time. Post-mortem examination revealed two fibroid tumors inside the abdominal cavity, several in the uterine wall in different places, and some outside of the uterus. In other words, there were intra-uterine, interstitial, and extra-uterine fibroid tumors, and two were found inside the abdominal cavity. One was attached to the intestinal surface, and one to the kidney. There were 17 fibroid tumors in all.

Dr. Francis H. Davenport, of Boston, had seen two such cases. In one case the tumor was about the size of a baseball, being completely detached from the uterus, situated on a level with the umbilicus on the right side, and nourished by the omentum. In the other case the patient was moribund when seen, so that no operation was thought of. Post-mortem examination revealed that she had a fibroid tumor which had started from the uterus, surrounded by dense adhesions, bowels, omentum, and a band of adhesions which caused obstruction, and this was followed by septic peritonitis. The tumor was about the size of a child's head.

Dr. J. Whitridge Williams, of Baltimore, had seen two similar cases to those reported by Dr. Peterson in his own experience, and one in the practice of another colleague. In one of his cases the tumor was from ten to twelve centimeters in diameter, absolutely free from the uterus, and enclosed within omentum, having obtained its nutriment from that structure. Microscopical examination showed it to be a typical myofibroma. So far as he could make out, the etiology was as follows: The woman had had a single pedunculated myoma arising from the fundus of the uterus which, during pregnancy, probably became adherent to the omentum, and as the uterus underwent involution the pedicle became stretched and eventually separation occurred.

The second case was a tumor about the size of a goose egg in the same location, nourished by omentum, but much less richly supplied with blood vessels. This tumor was almost entirely calcified.

Dr. Hunter Robb, of Cleveland, Ohio, said that the cases occurred more frequently than a review of the literature would seem to show. In a case of his the tumor was about the size of a child's head; it had absolutely no connection with the uterus, with the broad ligaments, ovaries or tubes. It was wrapped up in the omentum, intimately adherent to all the structures of the omentum, with large vessels dipping down into the omentum, as was usual where the omentum was adherent to a myomatous tumor, from which

it had received its blood supply. Rather than take time to separate the omentum it seemed wiser to extirpate practically the whole omentum, which he did in this particular instance. This was the only case he could recall of migratory myoma he had met with.

Gastroenterostomy

Dr. W. H. Wathen, of Louisville, discussed the various pathological conditions indicating the necessity for stomach drainage, and the operations that had been performed. He said that the operations of pyloric divulsion and pyloroplasty were obsolete; that the best methods of draining the stomach into the duodenum, were Villard's sub-pyloric gastric duodenostomy, as modified by Kocher's lateral gastroduodenostomy with vertical division of the duodeno-colic peritoneum, and Finney's gastropyloroduodenostomy, but that neither of these operations could, only in exceptional cases, take precedence over posterior retro-colic gastroduodenostomy at the bottom of the stomach with the attachment near the origin of the jejunum, thus eliminating the loop.

He denied that the passage of bile and pancreatic secretion into the stomach was responsible for regurgitant vomiting or the vicious circle, and referred to various experiments upon animals and to operations upon man, to justify this conclusion. He suggested that probably the presence of bile and pancreatic secretion in the stomach may so alkalize the stomach contents, as to aid in preventing jejunal ulceration in the distal end, a complication that had occasionally followed gastroenterostomy. He believed that the cause of the vicious circle and regurgitant vomiting would be found in the election of methods, based upon a false assumption of the physics and physiology of digestion, and in a defective technic.

He gave in detail the technic of the operation he was now doing for gastroenterostomy, with nearly perfect results. He did the posterior retro-colic operation, attaching the jejunum at the bottom of the stomach in an oblique direction. The jejunum was incised longitudinally for about two inches, and the attachment was made at about two or three inches below the duodeno-jejunal flexure, just far enough away to prevent tension, and at the same time entirely eliminated the jejunal loop, leaving the viscera in nearly natural relation.

He used the double layer of thread suture, believing that this gave better immediate and ultimate results, and prevented complications that had followed other methods. He removed an elliptical piece of mucous membrane from both stomach and bowel, even with the incised muscle tissue.

He said that with the adoption of the posterior retro-colic anastomosis with the elimination of the loop, there would be no longer any necessity for mutilating operations for closure or resection of the pylorus or jejunum, or for an entero-anastomosis, and that the posterior attachment might be made in nearly every case where a gastroenterostomy was indicated.

He also said that while the Murphy button had done much in the evolution of gastric and intestinal surgery, it would not be generally used in the future except in selected cases; and that if the experience of Ochsner and some other surgeons showed that equally good results followed the use of the McGraw ligature with an outer layer of sero-serous suture, this would be a great advantage over the stomach and intestinal incision, and the method would be generally adopted, for it reduced the operation to great simplicity. The McGraw ligature might be used as successfully in the posterior as in the anterior attachment, and its use practically removed all immediate danger from stomach and intestinal leakage, and the anastomosis might be made without the use of clamps. He concluded as follows:

1. Some cases of acute and sub-acute gastric and duodenal ulcer, and many cases of chronic and duodenal ulcer, should be treated by efficient stomach drainage into the duodenum or jejunum.

2. Drainage by pyloric divulsion, and by pyloroplasty with its modifications, had not been successful, and these methods are now practically obsolete.

3. Gastroduodenostomy, as modified by Kocher and Finney, might give efficient drainage in many cases, but it should be limited to such cases as could not be operated upon by a posterior retro-colic gastroenterostomy with the anastomosis near the duodeno-jejunal flexure.

4. Anterior anti-colic gastroenterostomy should not be an operation of election, but an operation of expediency or necessity, to give temporary relief, or to meet special abnormal conditions that may contra-indicate the posterior attachment.

5. The ideal operation of election must be the posterior retro-colic attachment near the beginning of the jejunum, and at the bottom of the stomach in the pyloric end, thus eliminating the loop.

6. This gave the most efficient drainage, prevented the vicious circle and regurgitant vomiting, left the stomach and intestine in nearly normal relation, and was followed by better immediate and ultimate results.

7. The intestinal incision should be made longitudinally and not less than two inches long, and the stomach incision of corresponding length, preferably in the oblique direction. An elliptical strip of mucosa should be incised from both stomach and intestinal incision.

8. The anastomosis was best made with a continuous suture (Pagenstecher or silk) using a full-curved round-pointed needle. The suture should be applied in double layers, the inner to include all the visceral layers and unite the cut edges of the opening; the outer 1-5 inch away, to include the serous and sub-serous layers.

9. Enteroenterostomy, or closure or resection of the proximal jejunum or the pylorus was unnecessary. It committed a traumatism and left a deformity that might cause immediate and subsequent bad results.

SECOND DAY—*Afternoon Session*

SYMPOSIUM ON THE TOXEMIAS OF PREGNANCY

DR. J. CLIFTON EDGAR, of New York, contributed a paper entitled, CLINICAL TYPES OF PREGNANCY TOXEMIA. (This paper appears in full in this Journal, page 45.)

RENAL INSUFFICIENCY

DR. HENRY C. COE, of New York, in a paper with this title, said that this referred not only to diminished amount of urine, but to deficient excretion of urea, with or without accompanying albumin and casts. The importance of this subject could not be over-estimated, on account of its direct bearing on the prevention of eclampsia. He pointed out the erroneous views formerly held that eclampsia always came suddenly, without warning. Now it was known that danger signals were seldom absent long before the attack if careful watch was kept over the urine. Diminished urea, not the presence of albumin, was the important point. There were two channels for the excretion of toxins—kidneys and intestines. Both must be made use of. The kidneys and bowels should be flushed, and the diet regulated all through pregnancy. One should know the daily amount of urine at frequent intervals, and the amount of urea. He should not wait for general evidences of toxemia, gastric disturbances, pruritus, headache, etc., put anticipate them. Preventive medicine had nowhere more important application than in the case of a pregnant female. Every one had had occasion to reproach himself for carelessness in this particular.

Illustrative cases were cited.

DR. J. WHITRIDGE WILLIAMS, of Baltimore, read a paper entitled, PERNICIOUS VOMITING OF PREGNANCY. (This paper appears in this issue of the Journal. See page 41.)

DR. CYRUS A. KIRKLEY, of Toledo, Ohio, read a paper on ECLAMPSIA AND ITS TREATMENT.

He said eclampsia was the result of autoinfection. Little was known of its etiology and pathology, and the mortality rate would likely continue high until more attention was given to prophylaxis. Waste products from the liver, intestines, and kidneys, augmented by uterine and fetal metabolism, were most probably the source of the toxins that produced eclampsia. Renal insufficiency was usually an etiological factor, albuminuria having nothing to do with its production. Uterine contraction might act as an exciting cause, and Osthoff says that all cases of eclampsia reflex origin, anemia of the brain resulting. According to this theory one could understand how an eclampsia might occur without kidney lesion.

Dr. Grandin had pointed out the toxemia was not likely in those cases in which there was moderate albuminuria, while violent toxemia might occur when there was little or no albumin. That fetal metabolism may be a factor in the production of eclampsia would seem probable from the fact that when the child in utero dies or is expelled, convulsions usually cease. It was known that the system was overwhelmed with toxins, and that their sources of elimination were interrupted. There could hardly be a doubt but that the condition of the urine in pregnancy had something to do with the production of eclampsia. As the amount of urea excreted diminished, toxemia developed. There was increased production and diminished excretion. The quantity of urea in the urine quite accurately determined the pregnant woman's condition. Professor Ewing, of Cornell, considered the toxemia of pregnancy a result of functional disease of the liver, resulting finally in hemorrhagic hepatitis, or acute yellow atrophy. He regarded kidney derangement as secondary. This view is also shared by Professor Allen, of Cambridge, Maryland.

Prophylactic was the most successful treatment. Elimination by the great emunctories was the main indication. Cases in which there was diminished excretion of urea, scanty, high-colored urine, precordial oppression, headache with or without impairment of hearing, and a rapid, tense pulse, were usually immediately and often permanently relieved by free venesection. Though its application had its limitations, still in suitable cases its value could

not be overestimated. Evacuation of the uterus should be resorted to only when other means of relief had failed. Buttermilk to the exclusion of almost anything else was the best diet. As a curative agent, no remedy could be compared with venesection. Its promptness in the elimination of the toxins protected the brain, and insured better results from other remedies. Veratrum viride had its place in the treatment of eclampsia, but surely not as a substitute for venesection. Morphine was of doubtful value, because it would seem to prevent elimination. It should be given hypodermically if at all. After venesection, calomel in full doses, salines, chloral hydrate, sodium and potassium bromide, irrigation of the colon with hot saline solution, and intravenous infusion of normal salt solution—especially after venesection—were remedies of the greatest value. Whatever the treatment, delivery should be accomplished at the earliest possible moment.

Dr. Franklin S. Newell, of Boston, followed with a paper on The Treatment of Eclampsia.

He stated the fact that the specific toxin or toxins which produced eclampsia had not yet been isolated rendered it impossible for the condition to be treated on a scientific basis, and at present treatment had to be instituted in accordance with the clinical phenomena and a rational interpretation of the pathological lesions found at autopsy.

Eclampsia must be due either to a sudden absorption of a larger amount of the product of fetal metabolism than the maternal organization could care for, or to an accumulation of toxins due to a lack of proper excretion of an amount which should be eliminated without serious damage by a normal patient. That both of these conditions might occur would seem to be proved by clinical observations, since in one patient he saw the sudden onset of convulsions without premonitory symptoms, and in the next a long line of symptoms which showed the toxemia to be of considerable duration.

The next point considered was, What were the effects produced by the toxins? In a general way, all cases might be divided into two groups, hepatic and renal, according to whether the liver or kidneys were most prominently affected. The distinction must be one of degree rather than of kind, or else we were trying to group two distinct toxemias under one heading.

A close analysis of the two classes of cases, the comparison of the results of early and late treatment, and the fact that the cases of the renal type were seldom fatal, if properly treated, gave reason to believe that the two types of cases differed only in severity and not in the nature of the toxemia, and that the hepatic cases were those due to an overwhelming toxemia or to neglect of the early stages of the process.

The principal dangers to the patient came from heart failure, due to the strain induced during the convulsion or to exhaustion following the extra work necessitated by the vaso-motor spasm; and from cerebral hemorrhage caused by the convulsions.

Prophylaxis should be directed to the prevention of any accumulation of waste products at any period of pregnancy, combined with the ordinary hygienic measures to maintain and improve the patient's general condition.

The bowels should be kept thoroughly open throughout pregnancy by regulation of the diet and by the use of such of the mild cathartics as might be necessary, and in addition the intestinal tract should be thoroughly cleansed every three or four weeks by the administration of calomel, followed by a saline purge. This treatment, combined with the ingestion of large amounts of water, at least six glasses between meals, would keep the system thoroughly flushed out, and he believes prevent the development of the ordinary form of eclampsia, though the sudden absorption of an overwhelming dose of toxins would, in rare cases, occur and seem to render all attempts at prophylaxis futile.

The appearance of toxemic symptoms called for prompt and thorough treatment, rest in bed, milk diet, and the removal of the toxins by free excretion. If, in spite of this treatment, convulsions develop, the most radical treatment is indicated at the earliest possible moment, since it was among cases which came to treatment late that most fatal results occurred. Treatment to be efficient should have four distinct objects in view: (1) Prevention of further absorption of toxins by the removal of the cause; (2) limitation of damage by the toxins already in the system; (3) elimination of the toxins; (4) treatment of the patient.

Since the toxemia which produced the eclamptic attacks is almost certainly to be of fetal origin, the inference was clear that the supply of toxins could only be stopped by emptying the uterus. The author's experience with the Stroganoff treatment had convinced him that delay while attempting to suppress or limit the effects of the absorbed toxins distinctly lessened the patient's chances of recovery. The opinions of various observers were in accord that most of the fatal hepatic cases came under observation late in the disease, and that the results of early interference were much more favorable than the general statistics of the disease warranted. The method of operative delivery must

be adapted to the needs of the individual patient, but in general it might be said that the most rapid, safe method was the most efficient. Mechanical dilatation of the cervix and immediate delivery was the most satisfactory method for the majority of cases. Multiple incision of the cervix might be necessary in rare cases. Cesarean section was unnecessary except when the absolute indication was present. The slow methods of dilatation increased the tendency to convulsions and were never to be advocated. The fact that a fair proportion of the cases treated medically recovered was a common argument in favor of a policy of so-called conservatism, but his experience was that the mortality steadily increased in proportion to the delay in operating.

The absorption of toxins being stopped, the next step was to limit the damage those already absorbed could do. The effect of the convulsions on the heart and in causing cerebral hemorrhage was the great source of danger to the patient next to the pathological lesions produced by the action of the toxins on the tissues, and the inference was clear that the convulsions must be controlled until the toxins were eliminated. He had found the use of morphia and hydrobromate of hyoscin in combination most efficient for this purpose, to be repeated at hourly intervals twice or three times, according to indications. Hyoscin had a double action in these cases, as it also acted in relieving the vaso-motor spasm and in favoring excretion. Chloral was useful after the acute stage was passed to keep up the sedative action, but its action was too uncertain for it to be used as a substitute for the more powerful drugs. The administration of chloroform and ether during a convulsion was useless, as so little could be absorbed and oxygen was of much greater importance and value.

Excretion was almost at a standstill in eclampsia, due partly to the direct action of the toxins on the organs themselves, and partly to a condition analogous to vaso-motor spasm induced by irritation of the spinal center.

The irritant action of the toxins was best minimized by the free use of normal salt solution, given either subcutaneously or intravenously, to the point of toleration, care being taken not to overload the heart and increase the tendency to pulmonary edema. Bleeding was of great value in many cases, even in those with a poor pulse. The use of morphia and hyoscin combined with the dilution of the toxins in the blood was usually efficient in unlocking the vaso-motor spasm and starting excretion, but nitroglycerine was often a valuable aid.

The intestinal tract was the most important channel for excretion of the toxins, and he had found thoroughly satisfactory results from the introduction of one or two ounces of Epsom salts into the stomach by a tube at the time of operation, followed by repeated drop doses of croton oil, resulting in combination with saline infusion in washing the toxins from the blood into the intestines and securing rapid elimination.

The urine was best stimulated by the saline infusion, followed by the ingestion of large quantities of water or cream of tartar water, when the patient could swallow.

The skin action was comparatively unimportant, if the other emunctories were free and required no special treatment. Sweating almost invariably started up when the other organs began to act, and the use of hot air and hot water baths threw added strain on the heart and increased the danger of its giving out without a compensatory benefit.

In so severe a condition as eclampsia the temptation must always be resisted of treating the disease at the expense of the patient, and surgical shock or failing heart action might at any time render the abandonment of active measures necessary. In certain cases the patient's condition might render active treatment impossible, and the treatment must be directed, not to curing the disease, but to attempts to improve the general condition to a point where treatment of the disease would not be immediately fatal.

For some days after the acute process had subsided, the patient should be kept on a liquid diet. Absolute quiet and freedom from care were imperative and free excretion should be maintained. Sedatives and stimulants should be used as indicated.

DR. HENRY D. FRY, of Washington, D. C., read the last paper in the symposium entitled, VAGINAL CESAREAN SECTION IN CASES OF ECLAMPSIA. (This paper appears in this issue of the Journal. See page 58.)

DR. EDWARD P. DAVIS, of Philadelphia, stated, concerning Dr. Williams' paper, that it was difficult to make two classes, namely, neurotic and reflex, for in neurotic women it was almost an impossibility to state that their condition was not a reflex one, originating in pregnancy, and hence he had been unable to make but two classes, the neurotic, including the reflex, and the toxemic.

The vomiting of pregnancy might be caused by the absorption of syncytial elements. He reported to the Society some years ago a case in which a patient died after vomiting of pregnancy. In this case the uterus was emptied; the uterus and adnexa

were normal, but in which deciduoma malignum was found in various viscera of the body. This was the second or third observation of its kind reported, the first one having been made by Schmorl.

So far as the toxemia of vomiting went, and the treatment of the case, he had found great value in relying upon an examination of the blood, especially in determining the time at which pregnancy must be interrupted. Not only had he been accustomed to watch the urine, but estimated the urea, and examined the blood with a view of determining the presence or absence of the disintegration of the red blood cells. These things had an important bearing on when to empty the uterus.

He expressed himself as being in accord with the investigations and recommendations of Dr. Williams relative to diagnosis and treatment.

With regard to the paper of Dr. Newell, he believed eclampsia did not always come from fetal toxins, for the fetus might die in utero, and yet the toxemia continue. Eclampsia had occurred when the uterus contained a dead ovum or blighted mole, and this led us to believe that it was not the fetal toxins themselves as chemical bodies, but syncytial cells, or elements of syncytial tissue which caused eclampsia, if they caused it at all, and undoubtedly they contributed.

He agreed with Dr. Newell that the renal types were more favorable, and that patients did not die as rapidly from those types as from the hepatic form. The renal forms were more favorable for treatment, so much so that in many cases he based his prognosis upon the differentiation in the type of the toxemia. He considered hepatic toxemia grave, while renal toxemia was far more susceptible to treatment and recovery.

As to vaginal Cesarean section, it had advantages over abdominal section, in that it could be done more quickly by those who were skilled in the operation. He spoke against rapid dilatation by any method whatever. In the presence of a skilled operator, with hosiptal facilities, the patient being in a good general condition, Cesarean section might be practiced. He did not say that it should be practiced always, but it was justifiable, especially if the fetus was in good condition. Unless one had such opportunities, he should treat the patient by elimination, by bleeding, by intravenous transfusion, and veratrum viride, until labor began, and when one could extract the fetus with little or no violence, and comparatively easily, the uterus might be emptied. We should not consider the life of the fetus in comparison with the mother. He drew an analogy between central placenta previa and eclampsia. He thought more women could be saved if the fetus were given less consideration than if one hesitated over a choice of method of treatment.

Dr. Edwin B. Cragin, of New York City, had been in the habit of dividing the vomiting of pregnancy into toxemic and neurotic, not attempting to divide the neurotic into neurotic *per se* and reflex. He had taught for some time that if a patient had severe vomiting, especially in the latter weeks of pregnancy, it was practically of toxemic origin, while if the patient had it in the early weeks or early months of pregnancy, it might be either toxemic or neurotic.

In regard to the paper of Dr. Williams, he was hardly ready as yet to lay quite as much stress on the ammonia output, and looking apparently at that as the chief indication of the severe type of cause. It seemed to him that there were several red flags, all of which should be looked upon as of more or less value. Examination of the blood had proved of value to him. The presence of acetone and of diacetic acid in large amounts in the urine had also proved of value, in making a prognosis and in indicating the line of treatment to be pursued.

In regard to the treatment of eclampsia, a year ago he thought he could have endorsed everything that had been said by the gentlemen who read the papers on treatment. He came before the Society a year ago with some such record as this: He lost one patient out of thirty-one cases of eclampsia. He now began venesection and intravenous transfusion as a treatment for eclampsia at the Sloane Maternity. There had occurred in his experience 115 cases of eclampsia, and of this number he had lost twenty. He had lost nine out of twenty in the last year. In this connection it should be said that where there was an ambulance service, desperate cases were brought in hurriedly in the last stages, so that the obstetrician was almost bound to lose a group of cases simply because he got them too late. Of the twenty that died, venesection was done in five, and intravenous infusion in thirteen. Of the ninety-five that recovered, venesection was done in seven, and intravenous infusion in only nine. In a series of thirty-one in which he lost only one patient, venesection was done only four times, and in these thirty-one infusion only six times, and the patient who died was infused. In the last nine cases that died, nine were infused intravenously, and four had venesection. He confessed that at the end of the year he was a little discouraged as to the value of venesection and intravenous transfusion, and in the last week he gave orders to the staff to go back to the treatment recommended a year and a half ago.

Dr. A. Lapthorn Smith, of Montreal, had never seen a woman die from the vomiting of pregnancy. During the first fifteen years of his practice he made it an invariable rule to empty the uterus as soon as the woman was in danger, but during the last ten years he had been a little less ready to empty the uterus and had paid more attention to treatment. He had advised the family physician to clear out the bowels, and to keep them active all the time, and by so doing many of the women have got along without having the uterus emptied.

Dr. Reuben Peterson, of Ann Arbor, Michigan, had been exceedingly interested in the etiology and pathology as outlined by Dr. Williams. If his deductions were true, then we had something definite by which to gauge these cases. A difficulty that had confronted him many times was to say what cases should be placed in the dangerous category, when we should interfere, etc.

In regard to the operative treatment of eclampsia, he wanted to put on record his experience with a case of vaginal Cesarean section. His patient was a woman who was brought to the hospital in convulsions. She was twenty-two or twenty-three years of age, and about six and a half months advanced in pregnancy. The cervix was very rigid, and believing as he did in the bad effects of eclampsia because of dilatation of the cervix by any method, he thought he would try vaginal Cesarean section. The operation was performed in accordance with the lines laid down by Dr. Fry. He made a T-shaped incision, as from his experience in vaginal work he thought the bladder could be dissected up better by means of such an incision than simply a transverse incision. The incision in the uterus was about 3½ inches long; he applied forceps and delivered without any difficulty. There was no bleeding. He put in a drain because he had found in those cases where the bladder was dissected up, sometimes hemorrhage ensued. There was no treatment for the convulsions, and the woman did well. The child lived only a few minutes after delivery. This was a far simpler mode of treatment for those cases of rigid cervix, and was indicated in more cases now of normal pelvis than the ordinary abdominal Cesarean section. He did not believe it was advisable for the general practitioner to undertake such an operation.

Dr. Philander A. Harris, of Paterson, N. J., felt that the physician who recommended section of the uterus to effect delivery certainly could not succeed with any method of dilating it. There were probably a few, but an extremely small percentage, of cervices greatly distorted which would not yield without laceration either by the force of a finger or the application of an instrument. On an instrument perfected by himself there was a dynamometer by which he could tell the number of pounds of force he was exerting to effect dilatation. He had brought about dilatation with this instrument in two cases without lacerating the vagina. The instrument was comparatively safe. He had repeatedly delivered women, after instrumental dilatation, without any hemorrhage, without lacerating the cervix.

Dr. Seth C. Gordon, of Maine, said he did not believe any man could tell *a priori* when any woman was going to have eclampsia. There were certain women who were neurotic and who might have eclampsia. One of the most important things was to keep up normal salt solution in these cases regularly, once or twice every twenty-four hours.

He believed that an attempt to dilate rapidly was a mistake, because rapid dilatation was undoubtedly an element in producing convulsions, in that it inflicted traumatism.

Dr. T. A. Reamy, of Cincinnati, Ohio, advocated larger doses of veratrum viride than were usually given in cases of eclampsia, saying that the average practitioner did not give enough to produce the desired effect. It should be given in doses sufficiently large to stop convulsions. Immediate danger lay in the convulsions themselves. In the neurotic cases, verging upon hysteria, often the hypodermic injection of morphine would stop convulsions if given in sufficiently large doses. In the class of cases under discussion the women should be kept under the influence, so to speak, of veratrum viride until all danger was past.

Dr. Frederick W. Sears, of Syracuse, had not seen a woman die from the vomiting of pregnancy, but he had seen one woman come so near to it that he did not want it repeated. He believed she would have died if pregnancy had not been terminated. Vomiting of pregnancy, when it occurred during the second pregnancy, was usually more severe than the first. In eclampsia it had been his experience that it was not repeated in the next pregnancy. One such case he reported in detail. He was called to see a woman who was profoundly eclamptic. She had had four seizures, and was delivered successfully. She remained unconscious for more than twenty-four hours. Since that time she had gone through pregnancy

and labor successfully without albuminuria or any abnormal symptoms.

Dr. William S. Stone, of New York City, stated that when he wrote and read a paper on this subject in December, 1903, he believed it was not generally accepted by the profession at large that the vomiting of pregnancy was of toxemic origin, and it was also not generally accepted that the lesion of the vomiting of pregnancy in the fatal cases at least was one analogous to that found in acute yellow atrophy of the liver. The chief point he tried to make at that time was merely to put cases of vomiting of pregnancy on a toxemic basis, and while he was perfectly willing to admit that it was very probable that the lesion so beautifully demonstrated by Dr. Williams corresponded in general to the clinical type of vomiting, and that the other lesion corresponded to the eclamptic group of cases, nevertheless it was pointed out that there were border line cases.

He had had the opportunity recently of observing the urine in three cases of vomiting of pregnancy rather perfectly. In a case of severe vomiting of pregnancy the total nitrogen was only a little decreased; the urea nitrogen was 80 per cent; it was not much changed; the ammonia nitrogen and the amido-acids neither of them was much changed. In another case of severe vomiting of pregnancy, in the last two weeks, in addition to vomiting, the woman developed a severe ptyalism, which was a source of more discomfort to her than vomiting. She was also jaundiced. In this case the urea nitrogen was only 70 per cent; ammonia nitrogen was not increased; the amido-acids were 22 per cent. Also in both of these cases there were leucin and tyrosin. There was found in the urine in another fatal case, dying a few hours after admission to the hospital, that the amido-acids were increased to 19 per cent, and ammonia nitrogen to 15 per cent.

Dr. M. Stamm, of Fremont, Ohio, by invitation, said a distinction should be made between conservative vaginal Cesarean section and radical vaginal Cesarean section, as the latter was undertaken for cancer or for sepsis. The conservative operation was done for eclampsia; uncontrollable vomiting; for stenosis after amputation; heart affection and stenosis; rigidity of the cervix (tetanus uteri); painful edema of the posterior portion of the cervix; dangerous hemorrhage due to premature detachment of the placenta; mitral stenosis in a moribund patient by Dührssen; heart disease and nephritis by Bumm; sepsis by Proubesta; pouch-like distention of the anterior wall of the uterus by Regnoli; incarcerated retroverted uterus by Wennerstrom; torpidity of uterus after induced abortion in two cases on account of narrow pelvis, by Bumm; for overstretched and attenuated lower uterine segment from stenosis, by Dührssen; for placenta previa once or twice; and for danger to the child.

Sippel, of Frankfurt, had for a long time happy results from hot baths and packing, diuretics, and diaphoretics, subcutaneous salt infusion, and avoidance of irritation, and thought the bad results of others were due to improper treatment. But all at once he lost three cases, and he came to the conclusion that eclampsia was due to pregnancy, and that the best thing was to terminate the latter as promptly as possible. Zweifel had reduced the mortality by a more active method from 36 per cent to 15. Plockner reported similar results.

The speaker fully agreed with Dr. Davis as to metal dilators, or any other method of dilatation. He did not think the obstetrician should add more to the woman's risk of life than she already had.

Any man who had made vaginal Cesarean section had probably found it a comparatively easy operation. About seventy-eight cases of conservative vaginal Cesarean section had been reported, with a mortality of 13 per cent. Two cases died from sepsis, due it was thought, mainly to manual or metal dilatation, but it was impossible to say definitely whether death was caused in these two patients by dilatation or by the vaginal Cesarean section. It was well to make this operation, if possible, in a hospital. He had performed three vaginal Cesarean sections altogether in the class of cases under discussion.

Dr. J. Riddle Goffe spoke of a case of vaginal Cesarean section he had the last winter. The woman was advanced six months in pregnancy; the fetus was dead; she had been in labor for nearly seven days, and when she came into his hands he found a long, hard, contracted cervix. He tried to dilate the cervix until he became tired, and then resorted to vaginal Cesarean section. This operation was easily and promptly performed; he then turned the fetus and delivered it. It was quickly done. There was almost no hemorrhage. He made a T-shaped incision in the anterior vaginal wall, stripped up the bladder from the anterior face of the incision, made one incision in the anterior wall of the uterus, taking in the long cervix. These incisions were closed with sutures, and the woman left the hospital on the tenth day

DR. EUGENE BOISE, of Grand Rapids, Michigan, said he had seen a great many cases of eclampsia, and had seen one die. He always delivered by manual dilatation, except in those cases that could be left to nature. In one case he thought he would make a vaginal Cesarean section because of the extreme rigidity of the cervix, but instead he injected a two per cent solution of cocaine (6 or 8 drops), in four different portions of the cervix, and in 15 or 20 minutes the cervix was dilated; it felt like a wet cloth. While cocaine might be dangerous in the hands of the general practitioner, he did not think it would be as dangerous as vaginal Cesarean section.

THIRD DAY—*Morning Session*

DR. EDWARD P. DAVIS, of Philadelphia, read a paper entitled, SUDDEN DEATH DURING OR IMMEDIATELY AFTER THE TERMINATION OF PREGNANCY OR OPERATION ON THE PELVIC ORGANS OF WOMEN. (This paper appears in this issue of the Journal. See page 29.)

DISCUSSION

DR. EDWIN B. CRAGIN, of New York, referred to the possibility of pulmonary embolism occurring after Cesarean section. It was his misfortune to see a case of Cesarean section die apparently from pulmonary embolus, and while he was not able to prove it by autopsy, all of the symptoms referred to by Dr. Davis were present, and it was the only diagnosis that could be made.

Several cases from toxemia of pregnancy, on which he had to operate suddenly, died in a way that would bring them under the class referred to by the essayist, and it seemed that poisoning the system by the toxemia was really the cause of some of these deaths, as he was unable to explain it by any lesion found at autopsy.

DR. ARTHUR W. JOHNSTONE, of Cincinnati, stated that just at daylight he was called to assist a confrere in delivering a very thin, emaciated women. The child had just been delivered. The uterus was emptied. There was no bleeding; but the woman seemed to be in profound shock, for which they could not account. A quart of normal salt solution was injected under the breast, with the administration of strychnia, and brought about the desired effect. When he had time to inquire about the case, he learned that the woman was an habitual diabetic, and that the child born was a boy. Within six months the woman came to see him again, believing she was pregnant the second time. She was. He watched her urine carefully during the whole pregnancy, and when the time came she was delivered of another boy without any untoward results. She was found to be diabetic again.

He was called in consultation to see a primipara, 40 years of age, very fat, whose child was born with shoulder presentation, the arms having been allowed to get over the head. He found that the perineum had been badly torn before the delivery of the child. The woman was in good condition after the birth of the child. The Crede method was followed. He repaired the laceration under chloroform. There was no bleeding. As soon as the chloroform was withdrawn, she went into profound shock, and in about half an hour died. He thought there might be such a thing as a shock which would kill these patients, or there might be a toxemia back of it.

DR. MATTHEW D. MANN, of Buffalo, New York, said the tendency to the formation of pulmonary embolism, according to our knowledge of the physiology or pathology of the condition, was very decidedly increased by severe hemorrhage. The tendency to clotting of the blood was greater after hemorrhage than it was under normal conditions; therefore, we might expect pulmonary embolism and sudden deaths in cases of placenta previa, or in those where there was severe hemorrhage during operation. He had seen three cases of sudden death following placenta previa; after the women had been delivered, after the hemorrhage had stopped, and everything seemed to be going on well, the women suddenly began to breathe in each case as if they had trouble with respiration; the pulse became very rapid and weak, and they died very quickly.

He had also seen several cases of death after operations, and he attributed death in each case to pulmonary embolism. One he remembered particularly was some years ago, after the removal of a sloughing fibroid from the inside of the uterus taken out through the vagina. The patient did well for 48 hours, then sat up in bed, and tumbled over dead.

DR. J. WHITRIDGE WILLIAMS, of Baltimore, stated that one of his patients had a perfectly normal labor, normal puerperium, got up on the tenth day, was discharged on the seventeenth day, and was walking out of the ward with her baby, and just as she opened the door to leave the ward she gave a shriek, threw up her hands,

and died in a few moments from pulmonary embolism. Embolus was demonstrated at autopsy.

Two years ago he had another woman who died under peculiar circumstances. She was head nurse in a small hospital in Baltimore; she became illegitimately pregnant; had had constructed a peculiarly-shaped corset to disguise her condition. This disguise was so effectual that she was able to continue her duties until the middle of the ninth month of pregnancy. Just before she fell into the speaker's hands her left leg began to swell, and pulse went up. She came to the Johns Hopkins Hospital with well-defined thrombosis of the right leg, with very rapid pulse. Her pulse went up so rapidly and became so alarming that he terminated pregnancy by the use of a rubber bag. The child was delivered; but the woman died about twenty-four hours later without any particular appreciable cause, simply from persistent high pulse. At the autopsy the vessels on the left side were entirely thrombosed, and thrombosis ended where the left iliac artery crosses the iliac vein, and he judged in this case the thrombosis of the left extremity was due to the pressure exerted by the pregnant uterus, aided by this peculiar corset, so that the iliac artery pressed on the vein and practically occluded it, bringing the circulation to a standstill and allowing thrombosis to occur. In this case there was absolutely no trace of pulmonary embolus at autopsy, and the cause of death was still unknown.

In a certain number of cases he was convinced that sudden death after the puerperium was directly mental in character. He cited a case in point.

Dr. Henry T. Byford, of Chicago, had had two cases that did not die. One was a woman who had a discharge that originated from a pus tube. She suddenly went into collapse towards the end of the operation. He was watching the anesthetizer and called on him to stop, and the wound was rapidly closed. The foot of the bed was elevated, and after diligently working over the woman for some time, she rallied and recovered.

In another case, after the anesthetic was stopped for some little time, the patient collapsed, and it took two hours to get her to breathe, and, while she finally recovered, she was quite sick for several days. He supposed that in both of these cases the collapse was due to the anesthetic.

Dr. Fernand Henrotin, of Chicago, said there was undoubtedly a secondary form of depression, and in cases terminating in death, the deaths were apparently due to the secondary effects of the anesthetic. Cases were cited.

Dr. Philander A. Harris reported the case of a man upon whom he operated for gall-stone disease. Ten and a half days after the operation the patient, who had no perceptible fever, or any increase in pulse rate, and was making a perfectly normal progress toward recovery, immediately after eating a light supper, or fifteen minutes thereafter, rang the bell, his nurse responded, the resident physician was called, and in about twenty minutes the patient died. The only thing found, upon extensive dissection, was a little tissue in the right side of the heart, about an inch and a half long, and from one-half to three-quarters of an inch wide, which had perforated the chorda tendinæ. With a forceps one could move it backward and forward of the chorda tendinæ. The valves were imperfectly developed.

The Mortality of Operations, Other Than Strumectomy, in Cases of Exophthalmic Goitre, with Special Reference to Gynecological Operations

Dr. Barton Cooke Hirst, of Philadelphia, read a paper on the above subject in which he said that to learn the collective experience of American surgeons with Graves' disease complicating operations, three hundred and sixty-six letters were sent to the members of the national societies of surgery and gynecology. Forty-three surgeons reported sixty-nine cases. This number, added to the six collected and reported by Sanderson, made a total of seventy-five. Of this number, thirteen died. In eleven of these fatal cases the cause of death was expressly stated to be acute thyroidism, with tachycardia to an extreme degree, and eventual heart failure. In one case (appendiceal abscess) the patient died of the combined effects of sepsis and thyroidism. In another (pelvic abscess) the patient died under chloroform before the operation was begun. Excluding these two cases, the mortality from thyroidism was 14.6 per cent, or including them, 17.3 per cent. The character of the operation seemed to have made little difference in the results. The mortality of the minor operations was 16 per cent; that of the hysterectomies and myomectomies, 13.3 per cent. It appeared, therefore, that the existence of exophthalmic goitre added about fifteen per cent to the mortality of any operation performed upon the patient.

In the first of the author's patients there was a distinct goitre and exophthalmos for years, but the tachycardia was moderate. The symptoms

in this case were never very alarming and soon yielded to treatment. It was not known that the second patient had Graves' disease until two days after the operation, when the pulse rose to 180, the eyes protruded, and the throat swelled. He then learned that since girlhood the woman had been subject to such attacks; but lately had been free from them. Although some improvement was shown after hypodermoclysis, purgation and heart stimulants on the first day that sypmtoms appeared, a rapid and complete recovery was secured in the next three or four days, apparently in consequence of the administration of supra-renal extract in three-grain doses every four hours.

Dr. Chauncey D. Palmer, of Cincinnati, read a paper entitled What is the Present Status of Electricity as a Therapeutic Agent in Gynecological Practice?

He said the importance of the subject was great, old as it was. No remedial agent had in its use witnessed more of the spirit of evolution and selection. Electricity was an agent which allowed us to influence at will nutrition and function. The faradic currents promoted uterine contractions, stimulated a sluggish pelvic circulation, and strengthened the intra-pelvic supports. The intra-pelvic pole of a short wire wholly intra-vaginal stimulated best the utero-sacral ligaments and the pelvic floor to contraction. Electricity used in this way was essentially a pelvic tonic.

He alluded to the value of measuring the current in individual cases, and pointed out when, and in what classes of gynecological cases electricity was useful, as, for instance, in certain cases of amenorrhea; many cases of undeveloped uteri; some cases of sclerosis of the uterus; super-involution of the uterus; and subinvolution of the uterus; dysmenorrhea; stenosis of the os externum and cervical canal; fibroids of the uterus; uterine displacements; uterine flexions; perimetritic pelvic exudations; inversion of uterus; ectopic gestation; functional diseases of the nervous system in women dependent upon or associated with ovarian and uterine diseases, reflex or not; neurotic manifestations at the menopause.

He discussed the value of the electro-angiotribe, and closed by saying that the possibilities of electricity as a therapeutic agent were by no means limited. In his paper he had attempted to speak of electricity, and place it on its proper basis, not to magnify or misrepresent its virtues, nor to depreciate its powers.

The following officers were elected for the ensuing year:

President, Dr. R. B. Maury, Memphis, Tennessee.

First Vice-President, Dr. Howard A. Kelly, Baltimore, Md.

Second Vice-President, Dr. Reuben Peterson, Ann Arbor, Mich.

Secretary, Dr. J. Riddle Goffe (re-elected), New York City.

Treasurer, Dr. J. Montgomery Baldy (re-elected), Philadelphia.

Hot Springs, Virginia, was selected as the place for holding the next meeting.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

JOHN B. MURPHY, M. D. — E. WYLLYS ANDREWS, M. D.
FREDERIC A. BESLEY, M. D. — WM. R. CUBBINS, M. D.

"ZUR DAUERHEILUNG DES BRUSTKREBSES." (The Permanence of the Cure of Carcinoma of the Mammary Gland.) Von Heinrich Schroder. *Beitrage Zur Klin. Chir.*, May, 1905, pp. 659.

In an article that shows careful analysis, Schroder brings together three hundred and forty-seven cases of carcinoma of the mammary gland, which have been operated upon in the Rostock clinic for a period of twenty-five and a half years, extending from 1875 to 1901.

These cases are only those in which a complete removal was attempted, and in which a diagnosis of carcinoma was confirmed by histologic examination. Of these three hundred and forty-seven patients, sixteen, or 4.61 per cent, died soon after the operation.

Many of these surgical procedures were undertaken in the early days of the antiseptic period, and the mortality rate is therefore somewhat high. Forty-five of the cases were reported as having remained well at the time of the writing, for periods varying from three to twenty-seven years and six months. Six patients died from other diseases, free from recurrence, after lapses of five years and nine months to twenty-six years. Nine others, in which no renewal of the process was evident after from three to eleven years and three months after operation, died later from unknown causes.

Of all the cases in which no recurrences are recorded, the smallest percentage is found between the ages of seventy and eighty years. One hundred and eighty-two cases ended fatally from recurrence or metastases, or both, though in fifteen of these, who died at times varying from one to fourteen years after operation, there was no local recurrence at the time of the lethal termination. There were, further, twenty cases, in which there probably were no recurrences, but the information, which was in most instances elicited by written inquiries, was not definite on this point. In a great number of cases under this head there was no specific information as to the exact location of any recurrences. In eighty-three cases of this class, more exact knowledge could be obtained, for fifty-three returned for another operation; two-thirds in the first year, twenty per cent in the second and third years, and the remainder in from five to fifteen years. The other thirty patients were all attacked by a renewal of the carcinomatous process in the scar or in surrounding tissue.

The most interesting group of cases includes those in which there were metastases.

V. Volkmann had asserted that an operation for cancer can be considered successful if three years pass without a recurrence. These cases show that this statement cannot be maintained. There were seventy-six cases that had passed the third year without a renewal of the process. Of these, fifteen had gone beyond four years, and were later, four to thirteen years, again attacked by the disease as recurrence or metastases.

This makes a percentage of 19.7 per cent that showed late recurrences, a ratio that is probably too low, for among the one hundred and eighty-two cases there was a large number that died later than three years after the operation, and in which some probably had recurrences after the three years.

AN INVESTIGATION ON THE REGENERATION OF NERVES, WITH A VIEW TO THE SURGICAL TREATMENT OF CERTAIN PARALYSES. By Basil Kilvington, M.S., M.D. *British Medical Journal*, May, 1905.

The experiments were carried out on dogs. The hind limb of the dog was the part experimented upon in all cases, and the experiments were directed on the same line as the crossing of the facial and spinal accessory. From the experiments the following deductions were drawn:

1. It is possible to functionate two passing groups of muscles by a single nerve which previously supplied one group only; or to put it in another way, it is possible to innervate fairly completely muscles with a much smaller number of motor horn cells than usually bring about this fact.

2. When the central end of one nerve is joined to the peripheral ends of two nerves there are many more fibers in the peripheral nerves than in the central nerve, so that the nerve fibers in the proximal trunk divide in going to the distal trunks.

3. In some cases, at least some of the branches from one nerve fiber go to supply one side, and others the opposing side of muscles. This may prevent very delicate movement being restored.

4. After this form of suturing, the arrangement of the nerve fasciculi in the peripheral nerves is altered considerably.

PNEUMATOCELE OF CRANIUM. By L. L. McArthur. *The Journal of the American Medical Association*, Chicago, May, 1905.

The author reports a case of this very rare condition, and appends a table which includes the salient features of thirty-three cases, which are all that have been reported. The table shows the following points:

Total, 33 cases; location, 33 occipital, 10 frontal. Sex, male, 22; female, 6; unknown, 5; age, 12 to 66 years; traumatic history, 10; inflammatory history, 10 (3 traumatic also); spontaneous, 16. Result: cure, 17; recurrence, 6; doubtful, 8; death, 2.

PATHOLOGICAL ANATOMY

The tumor consists of a collection of air between the bone and the periosteum. A ridge of bone forms at the point of separation of periosteum from calvarium.

ETIOLOGY

The real cause in a few cases is obscure, but in a majority of cases one of two etiologic factors can be elicited by the clinical history: 1, trauma; 2, sudden increased pressure within the buccal and oral cavities. Inflammatory processes sometimes produce the destruction of the bone. If, for any reason, the bone becomes absent, an increased air pressure within the frontal sinuses or mastoid cells can readily elevate the periosteum.

Treatment at the present time consists of opening the sac widely, under strict aseptic precautions, finding and enlarging the openings into mastoid cells, removing osteophytes and bony ridges, and holding the walls of sac in contact by compression.

GASTRO-ENTEROSTOMY AND PYLOROPLASTY. An Experimental Study by Means of the Rœntgen Rays. By Walter B. Cannon, M. D. and by John Bapst Blake, M. D., of Boston, Mass. *Annals of Surgery*, May, 1905.

Experiments were carried out by performing gastro-enterostomy on large cats, and later observing the behavior of various kinds of foods within the stomach.

The observations were made by means of the X-ray, the food having been mixed with subnitrate of bismuth.

In considering gastro-enterostomy, the subject is presented under five heads: drainage, the vicious circle, kinks, the disturbance of digestive processes, and the formation of duodenal ulcers.

After giving detailed description of the action of the stomach upon the food, the author's summary is as follows: "The stomach is not a passive bag. During digestion the cardiac end slowly contracts, pressing its contents into the pyloric end. Over the pyloric end, during digestion, peristaltic waves are continually running, churning the food with the gastric juice and forcing the chyme into the intestine. Observations on the functionating human stomach show that as it empties it shortens, especially along the greater curvature. Therefore, the part of the stomach lowest when the organ is full or relaxed is not lowest as it empties. The pylorus then becomes the lowest point. Even if 'gravity drainage' occurred, the pylorus is the natural outlet as long as the stomach retains its power of contracting.

"The pressure within the abdomen is approximately atmospheric pressure. The pressure in any part of the passive alimentary canal depends on the weight of the overlying abdominal organs. If the canal is inactive, the food, therefore, is as if surrounded by water. Gravity cannot act, and gravity drainage does not occur.

"After an ordinary meal the peristalsis of the pyloric end of the stomach makes the contents of this part more fluid than the contents of the cardiac end. Because peristaltic waves move toward the pylorus, the intra-gastric pressure is three or four times greater at the pylorus than at the cardiac end. Observation on large cats with gastro-enterostomy openings of various sizes at various parts of the stomach showed that unless the opening, or stoma, was in the antrum (i. e., close to the pylorus), the food, even when fluid, was pushed through the pylorus rather than through the stoma.

"With peristalsis only in the pyloric end of the stomach, with the intra-gastric pressure much greater at the pylorus than elsewhere in the stomach, and with the food in the pyloric end normally more fluid than in the cardiac end, the food is forced into the intestine through the pylorus and not through the artificial opening, when both ways are offered.

"Circulation of the food through the pylorus to the duodenum and back to the stomach through the anastomosis has been repeatedly observed.

but it was not followed by the clinical symptoms of the 'vicious circle.' The circulation was observed best when the stomach was full. The stretching of the stomach separates the lips of the stoma and draws the intestinal wall into line with the gastric wall. The openings into the intestine at the stoma then become mere slits, and act like valves, permitting the entrance, but preventing the exit, of the food.

"The clinical symptoms of the 'vicious circle' have been observed in animals in which a kink of the intestine has been found just distal to the anastomosis. Kinks at this point cannot be straightened by peristaltic activity because the circular fibres of the intestine are cut at the near-by stoma.

"It is important that the food be mixed with the secretions poured into the duodenum. These juices are highly effective in digestion, and also neutralize the acid chyme. If food leaves the stomach by the stoma, it is not mixed with these secretions. Jejunal ulcers, after gastro-enterostomy, may be due to the presence of acid in a region in which inorganic acid is not normally found.

"From the above considerations, it was concluded that the stoma should be large and as near to the pylorus as possible; that the circulation of the food be rendered less probable by avoidance of overeating, and that, so far as possible, kinks be obviated by attaching a narrow band of the distal gut to the stomach for several centimetres beyond the stoma, thus permitting peristalsis to become an effective force.

"The probability of a circulation of the food whenever the pylorus is left open, the non-mixture of the food with the digestive and neutralizing fluids in the duodenum, and the ever-present danger from kinks in gastro-enterostomy, make the operation not an ideal one.

"In pyloroplasty (preferably the Finney operation), these objections are avoided. And a too rapid exit of the food through the pylorus is prevented by rythmic segmentation of the food in the duodenum, an activity which, in part, replaces the functions of the pylorus, and also mixes the food with the pancreatic juice and the bile."

ACTINOMYCOSIS. Arthur Dean Bevan. *Annals of Surgery*, May, 1905.

The essayist deals with the subject from the clinical aspect, laying particular stress upon the differential diagnosis of the condition. He makes the point that in his cases he has observed that the actinomycotic granules were gray or translucent more often than yellow.

In this connection he calls attention to a source of possible error, for in one case of suppurating epithelioma, the pearls liberated by suppuration were mistaken for actinomycotic granules.

Mention is made of the difficulty of finding distinctive, characteristic fungi under the microscope.

He classifies actinomycosis clinically as:

1. Head and neck actinomycosis, with infection from mouth and pharynx.

2. Chest actinomyco is through respiratory tract.

3. Abdominal actinomycosis, with infection probably always through the alimentary canal, possibly through the genital tract of the female.

4. Actinomycosis of skin.

The conclusion is drawn that the disease is quite common, and is often not recognized.

The author reports six cases of his own, three abdominal, one pulmonary, one neck, and one rectal.

Treatment consists of laying open and curettment of sinuses and internal administration of iodide of potassium.

SOLUBLE BUTTON FOR INTESTINAL ANASTOMOSIS. By Peter Paterson, M. B. C. M. *Lancet*, April 1.

The author describes a button shaped and modeled after the Murphy button, with is made from gelatine and made partially non-absorbable by treating it with chrome alum. The degree of non-solubility depends upon the strength of the solution and the length of time it is allowed to remain in the solution.

The author advises a solution of ten grains of chrome alum dissolved in one ounce of cold water, the buttons to be left in the solution for from ten to twelve hours, and then kept in a fifty per cent alcohol solution.

The buttons are made by pouring liquid gelatine into molds prepared for the purpose. The technique of the application is much the same as for the Murphy button, a purse string suture being used, the halves of the button not being completely detached. If the halves should not fit tightly in closing, the opening in the female half can be smeared with a layer of thick hydraulic dental cement.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF GYNECOLOGY

UNDER THE CHARGE OF

J. CLARENCE WEBSTER, M. D. E. C. DUDLEY, M. D.
JOHN C. HOLLISTER, M. D.

"BEITRAGE ZUR KENNTNISS DER SOLIDEN OVARIEN TUMOREN." AUS DER KGL. UNIVERSITÄTS-FRAUER-KLINIK ZU LEIPZIG

(Von Adolf Glockner. Arch. f. Gyn. 1905, B. 75, H. 1.)

As to a classification of ovarian tumors he says: "The old division of tumors of ovary into cystic and solid has rightly given way to histologic and histogenetic points of difference." Nevertheless he uses the term Solid Tumor in a broad sense as including not only wholly solid tumors, but also those tumors a large part of which is made up of solid parts, including all Desmoids, and a greater part of the epithelial and metastatic ovarian tumors.

The article is based on material from Universitäts-Frauer-Klinik of old macroscopic and fresh microscopic specimens. Many sections were serial. Particular attention was paid to the remaining pedical and other ovary. Clinical data and late progress of cases are given as thoroughly as possible.

I. FIBROMA OF OVARY

Reports five cases in detail, and then gives as his conclusions:

(a) Ovario-fibroma occurs at no definite age.

(b) Acites regularly occurs.

(c) All cases were cured.

(d) Above five cases include only diffuse fibromata of ovary, not the more frequent but unimportant superficial fibromata.

(e) In two cases the point of origin was in lateral part of ovary. (Virchow mentions same.)

(f) Stroma in the portions of the tumors still containing ovarian tissue showed the same changes as in chronic oophoritis.

(g) Parts of the ovarian tissue were seen to be still capable of functionating as shown by presence of primary follicles, Graäfian follicles and corpora lutea.

II. SARCOMA OF OVARY

Fibro-sarcoma—one case.

Spindle-cell—six cases.

Small-round-cell—one case.

Remarks:

1. Frequency of ascites is emphasized.

2. Frequent occurrence of genital hemorrhage—five times in seven cases (in two cases possibly due to complication of uterine myoma). This has not been emphasized in the past, and is of special interest, especially in the two cases where it occurred at considerable time after cessation of menstruation.

3. Tumor was bilateral in only one case.

4. Recurrence in two cases out of five during first year after operation. No recurrence in 3 years in 2 cases; no recurrence in 6½ years in 1 case.

5. Macroscopical islands of ovarian tissue found in one case. Ovarian elements found microscopically in two cases.

6. Evidence that the sarcoma was secondary to a previous fibroma could be ascertained in only one case (possibly in two cases).

7. In six cases were there cysts caused by disintegration of tissue. In one case there was small cystic lymph vessel enlargement.

8. In all cases was the relationship of the tumor cells to the blood vessels demonstrable. The arrangement of tumor cells like a mantel about a small arterial vessel was very evident in four cases, but it is not right to infer that these cells had their origin from the eudothelium, and we cannot consider them eudotheliomata or angiomata.

III. PURE SOLID ADENOMA OF THE OVARY

Recites one case, describes why it is to be considered as adenoma and not as cystoma, and then says:

"The occurrence of pure noncystic adenoma is considered in literature as very rare. I have not succeeded in finding such a completely described case. Adeno-fibroma seems to occur more frequently."

Evidently there is no essential difference between

the pure adenoma and the more frequent cystadenoma which often contains pure adenomatous areas. In solid adenoma the secretory activity of the tumor cells which leads to cyst formation is secondary to cell proliferation.

From a clinical standpoint the presence of acetic fluid (in this case) even if small in amount, is of interest. The case reported has been free from recurrence for more than ten years.

IV. PSEUDO-PAPILLARY CYSTOMA

After referring to Wilson Fox as being the first to separate papillary cystoma from other ovarian cystoma, he speaks of the works of Waldeyer, Olshausen, Marchand, Coblenz, and V. Veit, which support this view. This has been generally accepted.

Pfannenstiel's classification based upon the chemical nature of cyst contents and upon the kind of lining cell is referred to.

Other kind of tumors have been compared with this tumor first described by Fox, so that to-day, under the general name of papillary cystoma neoplasms of very different kinds are frequently included.

Besides these two groups Fox rcognized a third group which was finally definitely described as Pseudo-papillary by Saxer.

The author then gives his own conclusions based upon his own investigations of many ovarian cystomata. He says: "These pseudo-papillary cystomata can be always differentiated from true papillary cystomata without even the aid of serial sections, and the whole make-up of these tumors is so characteristic that their nature can be usually determined by simply macroscopical examination."

Recites in detail seven cases describing accurately the cysts, their lining and the stroma.

He then says: "Projections into the lumen of the cystic cavities have a marked resemblance to papillary formation, but by making many serial sections it is found we have not to do with real papillary overgrowth, but with connective tissue septa, which do not have the one or more free points that papillae do."

Of the clinical peculiarities he refers to the following:

(1) There is no predisposing age.

(2) In regard to the prevalence of one-sided development, and of having an intra-peritoneal location (not an intra-ligamentary) these tumors correspond entirely to the pseudo-mucin cystomata.

(3) Presence of ascites in all cases.

(4) The anatomical structure of the tumors does not differ in external form from that of the common colloid or especially the pseudo-mucin cystomata, among which they must be classed. They correspond also in a cross section of the cystic areas. Cystic contents and variation of physical structure correspond also to that of the glandular cystoma.

The characteristic feature in the pseudo-papillary cystoma, consists in the varyingly abundant amounts of solid portions between the cysts by which the tumor gives more or less the impression of a solid tumor. For this reason these are classified among the solid ovarian tumors. Never can papillary formation be found in these solid areas even by the microscope in contrast to the papillary cystomata. No essential difference exists between the pseudomucin cystomata and pseudo-papillary cystomata. We have to do rather with a quantitative difference, but the pseudo-papillary tumors differ throughout from true papillary cystoma. In general in the pseudomucin cystoma, the secretory activity of the cells is the most important thing. The cell proliferation in the case of pseudopapillary cystoma is more marked than the cell secretion.

Histologically these tumors are benign, and clinically it would seem so too, as far as can be judged from the comparatively short postoperative observation of these cases.

V. CARCINOMA OF OVARY

Gives in detail 20 cases, among which there is one in which also tubercular nodules and granulation tissue in the connective tissue stroma of the tumor were found. No case of a combination of tuberculosis with carcinoma, or with other solid tumors of the ovary, has been before reported.

He says of the same case: "We have to do here with one of those very rare cases in which with a primary tuberculosis in other organs, we have a secondary involvement of the ovaries in which they were the first, and for a time at least, the only genital organs involved."

Only 3 such cases have been reported.

Speaking as a whole of the 20 reported cases, he refers to Siffert's article upon the clinical relationships of ovarian carcinoma and confines his own remarks to the later operation results.

Of 18 cases, 11 had recurrences as follows: 3 cases in the first six months; 3 cases in the next six months; 4 cases in the second year; 1 case in the third year.

The other 5 cases were free from recurrence: one and one-half years, 1 case; two years, nine months, 1 case; four years, ten months, 1 case; five years, 2 cases.

The number of cases he says is too limited

to draw definite conclusions as to the late results of operation, and one cannot fix a definite time when a permanent result can be assured, yet there seems to be a relatively frequent "spätrecidive" in the case of carcinoma of the ovary.

He shows operative results that argue for extirpation of the uterus at the same time. This a priori would seem to be due to the fact that more lymph channels from the ovary are removed when the uterus is extirpated, than when simply the tumor is removed.

As to the gross structure of ovarian carcinoma, "the more cystic it is, the more globular and the more firm it is, the more it approximates the characteristic cylindrical form of solid ovarian tumors."

A large number (9 cases) were completely solid, or contained cavities originating only from degenerated connective tissue. Small cysts were present in 5 cases; 2 were partly cystic; 4 were to a large extent cystic.

Macroscopical remains of ovarian tissue was present in 2 cases. In one half of all cases (9) microscopical ovarian tissue was present—usually corpora fibrosa. Areas of functionating ovarian tissue were found in all cases.

"A satisfactory classification of carcinoma of the ovary has not yet been made. One from a histogenetic point of view at this time, is not possible. A division into two main groups of solid and cystic carcinoma, and a further classification according to the most prominent morphological peculiarities is the most our present knowledge can do."

He considers those cystic in which large cavities exist and make up a considerable part of the tumor mass and which are not degeneration cavities.

The medullary tumors with definite alveolar structure are apparently the most frequent form of completely solid tumors in which the masses of cancer cells predominate considerably over the connective tissue areas.

Those tumors, the large part of which consist of solid processes and striæ yet in which there are some areas showing the points of origin of glandular formation, form a transition into adenocarcinoma.

Adeno-carcinomata are characterized by tubules of one or more layers, and as a rule, with a compact arrangement and a lining of cubical, especially cylindrical-celled, epithelium.

Solid Papillary Carcinomata seem to be relatively rare. In the same group belong also the rare cases of carcinomatous superficial papilloma.

The *Scirrbus Carcinomata* are characterized by the great development of connective tissue elements, having, as a rule, few nuclei.

One case of *myxomatous carcinoma* is described.

Cystic Carcinoma of the ovary is described and illustrated from the cases reported, likewise *Papillary Cystocarcinoma.*

"It is evidently true that in the case of solid carcinomata, the origin has not been from an original benign cystic tumor, even if such cystic areas are found, as they frequently are." In this he agrees with Pfanneustiel.

Of the histogenesis of ovarian carcinoma he says:

"The origin of a great part of the cystic tumors is due to an overgrowth of the epithelium in the surface of the ovary. It is less clear as to whether the epithelium of the primary or Graäfian follicle can be the starting point of tumor formation." He speaks of the different theories about the origin of the epithelium.

According to Walthard's theory, the origin of these tumors under consideration is not to be sought for in the masses of squamous epithelium or ciliated or goblet cells, not in the superficial or follicular epithelium, nor in the Wölffian remains in the hilus of the ovary, but are to be considered as congenital cell nests distributed through the ovary, i. e., congenital squamous, ciliated, and goblet cell areas. The author has found the same to be true in his examinations, and says:

"We must accept it as true that the origin of a very large part of the epithelial tumors of the ovary, even if the desmoids and teratoma are excluded, goes back to embryonic rests."

The question of the bilateral appearance of carcinoma of the ovary is discussed. He says:

"There were five cases in which there were gross anatomical tumors.

"Microscopically, carcinoma was found in the ovary on the other side in three cases that appeared normal grossly. Macroscopical cancer was present in the second ovary in five out of eighteen cases (27.8 per cent. Smaller percentage than given by other authors). Microscopic cancer in 46.7 per cent.

"A primary bilateral carcinomatous occurrence was present in three cases (16 per cent of the entire series, or 43 per cent of the bilateral cases), which speaks against Heinrichs's conclusion that bilateral involvement exists almost always as a metastatic affair.

"The prognosis in regard to the second ovary, even if there have been found only microscopical evidences of carcinoma, is unfavorable, and therefore we must conclude that we should remove the apparently sound ovary, without reference to the age of the individual.

"All of our cases that remained free from recurrence for several years were unilateral."

"Although our list of cases is too small to give accurate judgment as to the permanent results in ovarian cancer, yet Heinrich's conclusion that these cases are practically inoperable is too radical.

"Retrogressive metamorphoses are the same as in cancer elsewhere. The unusual frequency of mucous and mucoid degeneration should be emphasized. Giant cell formations in one third of the cases. This occurs very frequently in cancer showing marked retrogressive changes.

"Myxomatous degeneration of the stroma was found in 16 cases.

"Calcareous deposit in the stroma was marked in 1 case, more slightly marked in others.

"A marked distribution throughout the stroma of miliary tubercular granulation tissue was found (as described), in one case.

VI. FIBROSORCOMA OVARII MUCOCELLULARE CARCINOMATODES

(Marchand-Krukenberg.)

Reports one case in which there was present a primary ovarian tumor with metastasis in the vertebral column. Histologically the main mass of the tumors consisted of connective tissue rich in nuclei of the structure of fibrosorcoma, and throughout were peculiar, large swollen cells showing mucous changes, and having the appearance of epithelium. Many such cases have been considered and described as endothelioma. He accepts Marchand's name for such tumors on the ground that it contains best the status of our present knowledge of these tumors, because it is precise as to the anatomical make-up, and also does not prematurely prejudice one concerning the problematical histogenesis of the tumors.

VII. ENDOTHELIOMA AND RELATED TUMORS

(a) *Bilateral endothelioma of ovary.*

A case is described in great histological detail, which showed unusual degree of malignancy, and all through an abundant fibrillary connective tissue showed the peculiar disordered tumor cells, much like epithelial cells, and also marked mucous changes. Its origin was probably in the squamous cells of the stroma.

Many tumors having like macroscopical and microscopical appearances as endothelioma have really been found coincident with carcinoma of other organs; therefore this must be considered when estimating the relative frequency of ovarian endothelioma.

He does not agree with Pick, who says that the absence of a separate endothelial layer between the cell and masses and the adjoining connective tissue is pathognomonic for endothelioma, since such a layer was altogether absent in the lymph spaces in the case described, and has very frequently been found absent in more advanced carcinoma.

He says, finally, that he believes no sure diagnosis of endothelioma of the ovary should be made without an exclusion of a primary carcinoma by complete section. Even then confusion with epithelial tumors cannot be excluded, since all the so-called "transition forms" are deceptive, and possibly in the large tumors only epithelial elements could have given off the matrix, which elements are no longer demonstrable in the tumors. Only with these limitations could he consider his reported case as endothelioma.

To the term "perithelioma" he objects, on the ground that such tumors are not peculiar, inasmuch as all sarcomata frequently show the same perivascular irregular cell arrangement.

(b) *Tumors of ovary resembling cylindroma.*

The microscopical findings of one case are described at length. The peculiar spherical areas described, he says, have been described in a number of tumors of different organs, as the parotid gland, and such tumors have been designated as endothelioma or angio-sarcoma, and they occur frequently as the so-called cylindroma.

The spherical masses of cells, he agrees with Marchand, are derived from the stroma and also from the tumor cells.

The similarity to, and the difference between, this tumor and a cylindroma rests upon the appearance of those spherical areas which, as has already been shown, occur most characteristically in these tumors, and also upon the peculiar arrangement of the epithelial-like cells, and above all upon the undoubted origin of the tumor cells from the cells of the stroma. The most characteristic element for the cylindroma, as Billroth has shown, is the hyalin trabecular formation. This was practically absent in this case.

Such an ovarian tumor has not before been described in the literature.

Such tumors must be separated from carcinomata, as their histogenesis shows.

VIII. EMBRYONAL GLANDULAR OVARIAN TUMORS

A case is described in which the tumor resembled, in many parts, the so-called mixed tumor of the parotid. It had developed from the cells of the myxomatous tissue, but differed from parotid tumors in its irregular and peculiar development. It had more resemblance, anatomically and clinically, with the quite frequent kidney tumors of

early youth, the so-called "embryonal glandular tumors" of Birch-Hirschfeld.

He describes the similarity to such tumors, histologically, and clinically in that both are unusually prone to early recurrence.

The case described occurred in an eighteen-year old girl, showing that the embryonal glandular tumors do occur later than in childhood.

In tracing out the origin of such tumors, he examined many sections of human embryos, and found great similarity between the modified cells of the mesenchyme lying beneath the germinal epithelium and the "ground substance" of the reported tumor.

He simply establishes the existence and genesis of this remarkable tumor in the ovary, as well as its manifold resemblance to so-called gland tumors of the kidneys, and does not try to offer any hypothesis as to the origin and history of these embryonal rests.

The name, "Embryonalen Drusen Sarcome" (by Birch-Hirschfeld), is the most satisfactory.

LUTEIN CYSTS IN ASSOCIATION WITH VESICULAR MOLE AND CHORIO-EPITHELIOMATA. By Cuthbert Lockyer. *Journal of Obstetrics and Gynecology*, British Empire, February and March, 1905.

This article is based upon the study of four cases of degeneratio polycystica luteinatis and illustrated by five plates and some thirty-odd drawings, and is a contribution to the study of the normal and abnormal processes seen in the development and retrogression of the corpus luteum. One case was associated with vesicular mole, three with vesicular mole plus chorio-epithelioma.

I. CORPUS LUTEUM CYSTS

The steps in a natural, healthy retrogression of the corpus luteum are described and illustrated.

Breaks and irregularities in such a process offer an opportunity for one mode of development of the cysts in question.

He tabulates the various modes of the formation of lutein cysts as follows:

Retrograde stages of corpus luteum give:

1. Cysts arising in the central clot.
2. Cysts arising from displaced lutein tissue.

Maturation stages of Graäfian follicle give:

1. Epithelial lined cysts due to persistence of the granulosa.
2. Non-epithelial cysts due to absence of granulosa.
3. Hæmatomata.
4. Lymphangiectases.
5. Complication cysts.

He then says: "The majority of these cysts have no clinical significance, but under certain conditions not yet determined may develop very rapidly by a process of multiple cyst formation rather than by any enormous distension of a single cyst, the result being a tumor, generally not less in size than a fetal head, composed of a central core of œdematous ovarian stroma and a peripheral zone of cysts. These cysts may be multiple from the beginning. They contain a clear, highly albuminous, pale fluid; are described aptly as 'bubbles about to burst'; show no signs of becoming adherent; can be large enough to obstruct delivery, and, by twisting of their pedicles, can give rise to acute symptoms."

Three pathological conditions are then described:

1. The displacement and excess of lutein tissue.
2. Corpus luteum abscess.
3. Corpus luteum calcification.

He then says: "Most authors agree with me as to the origin of cysts, but I cannot satisfy myself that lutein cysts arise from lymphangiectases within corpora albicantia.

"Epithelial lutein cysts are the earliest of all lutein cysts to form and they arise exclusively from developing Graäfian follicles," is the author's idea in contrast to Pick's theory.

He speaks of the findings of different authors in regard to the part played by cysts and hematomata of lutein origin in oöphoritis, and the great frequency of their association.

He is opposed to Orthmann's view that epithelial cysts can arise after rupture of a ripe corpus luteum.

As to solid growths originating from the lutein cells, he says he has never met with one that could be proved to be so—the sections made simply showing that two pathological processes may exist in a follicle at one and the same time, but not proving that a lutein cyst may give rise to a solid neoplasm.

As to whether excess of displaced lutein tissue is the characteristic accompaniment of vesicular mole and chorio-epithelioma, he says: "In my limited experience I have found more lutein tissue present in such cases—either in the shape of lutein cysts or displaced lutein tissue—than in any other associated condition."

He ends his article with Frænkel's conclusions relative to internal lutein secretion, and with the conclusions of Jaffe on the origin of lutein cysts and their occurrence with vesicular mole.

A full bibliography is appended.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. Bacon, M. D. Rudolph W. Holmes, M. D.
C. V. Bachellé, M. D.

A STUDY OF RAPID DILATATION OF THE OS UTERI ACCORDING TO BOSSI, BASED ON THIRTY ADDITIONAL CASES

(Archiv. für Gynaekologie, vol. 73, page 439.)

Dr. B. Erlich, assistant in Leopold's clinic in Dresden, gives an elaborate abstract of Bossi's original paper and a history of the use of Bossi's instrument from its introduction in 1890 to the present time, with a resumé of the publication of all German and many non-German obstetricians. He then gives histories of thirty cases of the Dresden clinic in which Bossi's method was employed, and discusses the operation from the conclusions reached after a study of these thirty cases and seventeen cases formerly published.

Erlich considers eclampsia as one of the chief indications for dilatation and delivery. Although not all cases were saved, yet Leopold holds that the Bossi method should be considered almost as much a specific treatment in eclampsia as combined version in placenta previa. Infection during labor furnished the indication for dilatation in three cases and tetanus uteri and phthisis pulmonum in two each. Cessation of labor on account of contracted pelves gave the reason for interfering in six cases both because of the mother and child. Twice compression of the cord endangering the child led to interference. Erlich does not consider placenta previa an indication for the Bossi dilator, but in premature separation of the normally seated placenta the operation is of great value. In the induction of premature labor the Bossi instrument is used only to begin the dilatation, which is then completed with the metreurynter. In prolapse of the cord the Bossi method should be of great worth. It is not recommended in the treatment of abortion.

As to the time of pregnancy when the instrument can be used, Erlich agrees with Bossi that from the sixth month it may be employed.

Erlich recognizes that Bossi's method is more satisfactory and physiologic in case of a cervix that has undergone obliteration than in one in which this change has not taken place. The tendency of the cervix to recontract in some cases is recognized but not regarded as a serious objection to the operation.

In considering the technic of instrumental dilatation Erlich emphasizes the importance of studying the nature and condition of the os or cervix. Besides the amount of dilatation of the os and degree of obliteration of the cervix many other circumstances are important, such as spasm, rigidity of the os, scar changes as the result of old tears and operations, and slight serous infiltration of the cervical tissue. Also the number of the pregnancy, age of the patient, and the duration of pregnancy are to be considered. All these circumstances determine the rapidity of dilatation rather than the watch of the operator. In favorable conditions the dilatation of one degree in five minutes is perfectly safe.

The method of introduction of the instrument and the care to be taken in determining whether it is in place are discussed. The dilating occurs in the intervals between the pains. The fingers of one hand in the cervix determine the condition of the os and at once find a beginning tear. The chief rule in dilatation is to turn the screw frequently but only a short distance. With a full term child the dilatation should reach 10 cm.

How well the rule was followed to observe care and patience in dilatation appears in the statement that with obliterated cervices dilatation occurred in primiparæ in thirty-one minutes on the average and in multiparæ in eighteen minutes. In unobliterated cervices in primiparæ the time required was on the average thirty-six minutes and in multiparæ twenty-eight minutes.

The prognosis for mother and child depends to a considerable extent upon the choice of the delivery operation to follow the dilatation. Erlich agrees with Bossi that the forceps is preferable to version and extraction. In ten cases where labor was with aftercoming head, only two children were

born alive; while of nineteen children delivered by the forceps only two died, and these were in a feeble condition with poor fetal heart tones before the beginning of the operation. The contraction of the cervix around the head as well as the difficulties occasioned by the pelves led to the bad results after turning and extraction. Also lacerations of the obstetrical canal are always greater. Hence Erlich feels obliged to warn against turning and immediate extraction as a delivery operation to follow Bossi dilatation. In case this operation must be made on account of very pressing indications on the part of the mother, Erlich recommends to leave the delivery to nature or to employ the metreurynter for a few minutes after using the Bossi dilator.

In a study of the injuries resulting from the instrument or the delivery operation, Erlich classifies all of Leopold's cases according to the nature and grade of the injury and finds that in thirty-five of the forty-seven cases, or in 75 per cent, no injury or only very insignificant injuries resulted. In ten cases (21 per cent) moderate tears of the cervix were found. Some of these, however, were due to the delivery operation and not to the Bossi instrument. Two tears of considerable extent (4 per cent of the whole) were undoubtedly due to the dilator. A study of the puerperium record shows that in no case has the Bossi dilator exercised any influence in complicating the puerperium.

INDUCTION OF LABOR IN CONTRACTED PELVES WITH THE BOSSI DILATOR, FOLLOWED BY METREURYSIS

(Archiv. für Gynaekologie, vol. 73, page 544.)

Dr. G. Heller, of Leopold's clinic, Dresden, considers the advisability of inducing premature labor by the Bossi dilatation and metreurysis on the basis of thirty cases so treated in the Dresden clinic. The Bossi instrument is used to begin the dilatation. In about fifteen minutes the os is dilated about 4 to 5 cm. and then the metreurynter is substituted. The latter is left in place until it is spontaneously expelled. Generally some traction is employed. Both the Bossi instrument and the bag act dynamically, exciting uterine contractions. Besides the original Bossi instrument three different modifications have been used, the eight-branched Frommer dilator, the Krull instrument with removable branches and that of de Seigneux, which has several advantages over the others.

The contractions began at once with the instrumental dilatation. On the average, labor was in regular progress in one hour. The metreurynter was expelled in from two hours and forty minutes to twenty-three hours, and on the average in nine hours. The shortest labor lasted four hours, the longest twenty-five hours, thirty-five minutes, while the average duration was eleven hours, thirty minutes. The shortest spontaneous labor was eight hours, ten minutes, and the average duration was fifteen hours, twenty minutes. The puerperium lasted from nine to sixteen days. In eighteen cases there was no fever and in only one a more severe infection of the parametrium.

The advantages of this method over the bougie induction of labor are the shorter duration of labor and the better prognosis for both mother and child. A comparison of results reported with those in which other methods were used confirms the last statement.

LATE RESULTS OF BOSSI'S METHOD OF DILATATION

(Archiv. für Gynaekologie, vol. 75, page 1.)

F. Lichtenstein, from Leopold's clinic in Dresden, has made a late examination, and reports on eighteen patients on whom the Bossi dilator was used for various reasons. Out of the eighteen, in eleven cases he finds no tear, in four cases a small tear of the portio, in two cases large tears in the portio, and in one case a double sided cervical tear. As the small tears in the portio are hardly abnormal, there were only three in eighteen unphysiologic. In two of these cases the tear was probably due to the forceps operation instead of to the dilatation. In only one was the Bossi method certainly responsible for the result. Fine pictures are given of the tears.

As these results are opposed to those of von Bardeleben, who made late examinations of six patients from Gusserow's clinic in Berlin and found in all such bad results that he expressed the wish that the instrument should be discarded before more women are made invalids. Lichtenstein supposes that von Bardeleben used a less appropriate instrument or that he did not follow the directions for its use. Lichtenstein is better satisfied with the Bossi method than with the incisions of Duehrssen.

NON-OPERATIVE TREATMENT OF ECLAMPSIA

(C. S. Bacon. American Jour. Obstet., Apr., 1905.)

Bacon groups all forms of non-operative treatment under two heads, eliminative and symptomatic which includes antispasmodic and supporting. The eliminative form includes catharsis, diuresis, and diaphoresis, whether the agents be drugs, salt solution injections, or venesection. The sympto-

matic form of treatment includes the use of agents as morphin, chloral, chloroform, and ether, which obtund the sensibility; other agents as veratrum viride and lumbar puncture which lessen blood pressure, and oxygen, which supports the heart by aiding respiration. Diet must be considered, because of its effects on the eliminating organs and liver, which are injured by the disease. Rest and activity also have important bearing on the extension of the disease.

Attention to diet and bodily activity in the pre-convulsive stage, together with the regulation of elimination, are the only means of controlling the disease and preventing the climax. The amount of food should be reduced to just meet the needs of the body. Meat extractives, either in meat or soups and excess of inorganic salts should be excluded. Practically a milk diet is best, and in mild cases of edema, a restricted amount of vegetables, fruits, and cereals may be allowed. In severe cases, absolute rest in bed; in those less severe, restriction of bodily movements is as important as a proper diet in avoiding the checking of skin elimination by exposure, in preventing great production of waste matter which must be eliminated, and in maintaining an equable circulation, which is less likely to dislodge and disseminate morphologic products of the placenta.

He excludes nearly all diuretics as being more likely to cause renal irritation and so act as nephritic poison. The caffein group is excepted, but the metals, coal tar products, volatile oils, digitalis, aloin, urotropin and most of the salts of alkalis are excluded. The recent theories concerning the beneficial effects of the withdrawal of salt in cases of nephritic edema, must be considered, and, hence, salt solution should be used with caution in the treatment. Injection of excessive amounts of water should not be countenanced, but it may be used either alone or in salt solution as a colonic flushing to remove toxins from the bowel or to supply the needs of the system. To secure peristalsis, it should be of a temperature higher than that of the body, about 108 or 110 degrees, though a hot injection may start up uterine contraction.

As intestinal eliminants, calomel, salines, castor and croton oils are sufficient, and the more irritating purgatives are to be avoided because they effect the pelvic circulation, disturb the uterus, and irritate the kidneys. At intervals of from three to six days calomel should be given, preferably in divided doses, one-fourth grain every half hour from four to eight doses. Occasionally a dose of castor oil may be used advantageously; croton oil is to be used only in cases of convulsions, because of the ease of administration.

Edema and its effects are best relieved by sweats. These are given daily, preferably in the forenoon. The condition of the patient will decide whether they are to be given by means of the hot air cabinet, hot air bed apparatus, or by the hot wet pack. In less serious cases sometimes a hot tub bath in a warm room may suffice.

Venesection is good as an eliminative measure but should be used only in case of convulsions and even then resorted to with great care.

Treatment as outlined will relieve the eclamptogenic condition in a few days, but the patient must be kept under observation all through pregnancy. If great improvement occurs, the treatment may be relaxed, but never suspended entirely. If, in spite of the treatment, symptoms continue or increase in severity, it becomes necessary to decide whether the termination of pregnancy may not give better chances to the mother and child.

In a case having convulsions when non-operative treatment has been decided upon, the eliminative treatment is continued and the convulsions must be controlled by drugs which diminish the sensibilities of the reflex centers, such are morphin, chloral, chloroform, and ether. Anesthetics, he believes, have little place here, because of the degenerated heart and toxic blood conditions, making them more dangerous than in ordinary surgical anesthesias. Morphin and chloral may be used. The former is preferable, being non-irritating to the kidneys, dose being exact, absorption (hypodermically) perfect, its action immediate, and because it has a beneficial effect on the circulation. It is given in one-third to one-half grain dose when the patient is first seen, according to the number and severity of the attacks and then in one-sixth to one-fourth grains after each subsequent attack, until one grain to one and one-half grains are given. Danger of asphyxia is avoided by the use of oxygen. Veratrum viride, Bacon regards as dangerous, and advises against its use. Where large doses of morphin are necessary, oxygen counteracts the effects of the slowing of respiration. Oxygen should be given constantly when an anesthetic is used. The danger of convulsions is not entirely removed after the delivery of the child, and may last for some days. Heart weakness, renal insufficiency, may cause a fatal termination. The heart trouble may manifest itself first some days after delivery. For such cases strychnin and nitroglycerin in addition to the eliminative and supporting treatment may be useful.

REVIEWS

THE PRINCIPLES AND PRACTICE OF GYNECOLOGY FOR STUDENTS AND PRACTITIONERS. By E. C. Dudley, A.M., MD. Fourth Edition Revised. With 419 Illustrations in Colors and Monochrome, of which eighteen are full-page plates. Lea Brothers & Co., Philadelphia and New York, 1904.

This edition of Dr. Dudley's well-known book represents a thorough revision of the entire field of gynecology and must be regarded as a very valuable guide both for students and practitioners. Its importance is enhanced by the contributions which represent the personal experience of the author, who has long been known as an earnest and conscientious teacher and clinician. In reading the volume one feels that it is the work of a man who has strong convictions, who is capable of careful deliberation, and who is critical but not partisan.

Though scarcely larger than preceding editions, new matter has been introduced through condensation, rewriting and re-arrangement of various chapters. An important feature of the work is the introduction of more than three hundred new drawings, all borrowed illustrations having been excluded. Particular care has been given to the representation of various stages of operative procedures by drawings. Thus hysteromyomectomy is illustrated by twelve, perineal lacerations and their repair by thirty-two. These features are more elaborated than in the great majority of standard text-books, and indicate the special character of Dr. Dudley's volume, viz., its attention to the details of operative gynecology.

Another distinguishing mark is the general arrangement of topics, the various diseases being grouped not in regard to various organs and tissues but in pathological and etiological sequence. Thus, the infections and their sequelæ, e.g., vulvovaginitis, metritis, salpingitis, ovaritis, peritonitis, and cellulitis, are considered together. This plan is adopted by the author in order that the student may not lose sight of the real significance of morbid processes and the relationships which exist between them. Such a scheme is thoroughly scientific and possesses the advantages claimed by the author, even though our knowledge of etiologic factors is still very incomplete. The chapter on Aseptic Techique is very thorough, as might be expected from the author's well-known carefulness as an operator. The directions for skin-cleansing are very complete, but it is stated that absolute sterilization without injury to the skin is impossible. Rubber gloves are strongly recommended and the objections to their employment are well answered.

The chapter on Case-taking and Diagnosis is full of valuable suggestions worthy of careful study, especially by those who are beginning their gynecological work. The consideration of General Principles of operative work is also to be highly recommended. In discussing the question of drainage in abdominal operations, the author shares the opinion of many other expert gynecologists that this procedure is comparatively infrequently needed. Vaginal drainage is preferable to abdominal drainage in the great majority of cases.

A short chapter on the relations of Dress to the Diseases of Women is worthy of marked attention, too little consideration being given to the subject by the profession at large. The author insists upon even distribution for uniform protection against cold and wet, freedom from waist constriction and from traction. Every gynecologist must study the entire abdomen, particularly with reference to visceral displacement. Failure to do this must often lead to incompleteness in diagnosis and treatment. In the description of inflammations of the genital tract, there is a very full consideration of the underlying etiologic factors, and the pathologic changes. The importance of examing all the tissues liable to infection is urged, for the obvious reason that treatment is thereby likely to be more thorough, and a more accurate prognosis given. Too often, even now-a-days, is attention given to the most obvious lesion, while others which may be of more importance may be overlooked. Thus, it is not uncommon to find that a lacerated and thickened cervix is considered as the cause of a woman's ill-health, when an unrecognized tubal or ovarian inflammation is the important disturbing factor. Endless dissatisfaction may be produced by the mis-direction of therapeutic measures. In discussing the operative treatment of acute pelvic suppuration the following statement is made:

"The mortality of opening into the peritoneal cavity by either route in acute suppuration before

the pus has had time to become sterile is excessive. The withdrawal of such cases from laparotomy statistics and the relegation of them to the statistics of vaginal incision and drainage would reduce enormously the mortality of abdominal surgery." In this opinion every experienced gynecologist must share. Hasty interference by abdominal section in such cases has in the past been responsible for the loss of many lives. The careful investigation of clinical histories and of the condition of the blood makes it possible at the present time to adopt a conservative procedure which reduces mortality to a minimum.

In considering the treatment of uterine cancer, the author expresses a decided preference for vaginal hysterectomy. Regarding the extended abdominal operation involving free removal of the parametrium and lymphatic glands, he states that "the increased traumatism, great difficulty of technique, and, above all, the time required would probably increase the mortality of the operation enough to offset any possible advantage." Reference has already been made to the elaborate descriptions and illustrations of operative procedures. In the chapter dealing with plastic repair work on the perineum, there is a most exhaustive account of the methods adopted by the author and their underlying principles, written in such lucid style that it is very easily comprehended, even by the tyro. The whole work bears the impress of individuality and is to be regarded as a representative product of American Gynecology. It is, indeed, worthy of the honored place occupied by it in the medical literature of this country.

J. CLARENCE WEBSTER.

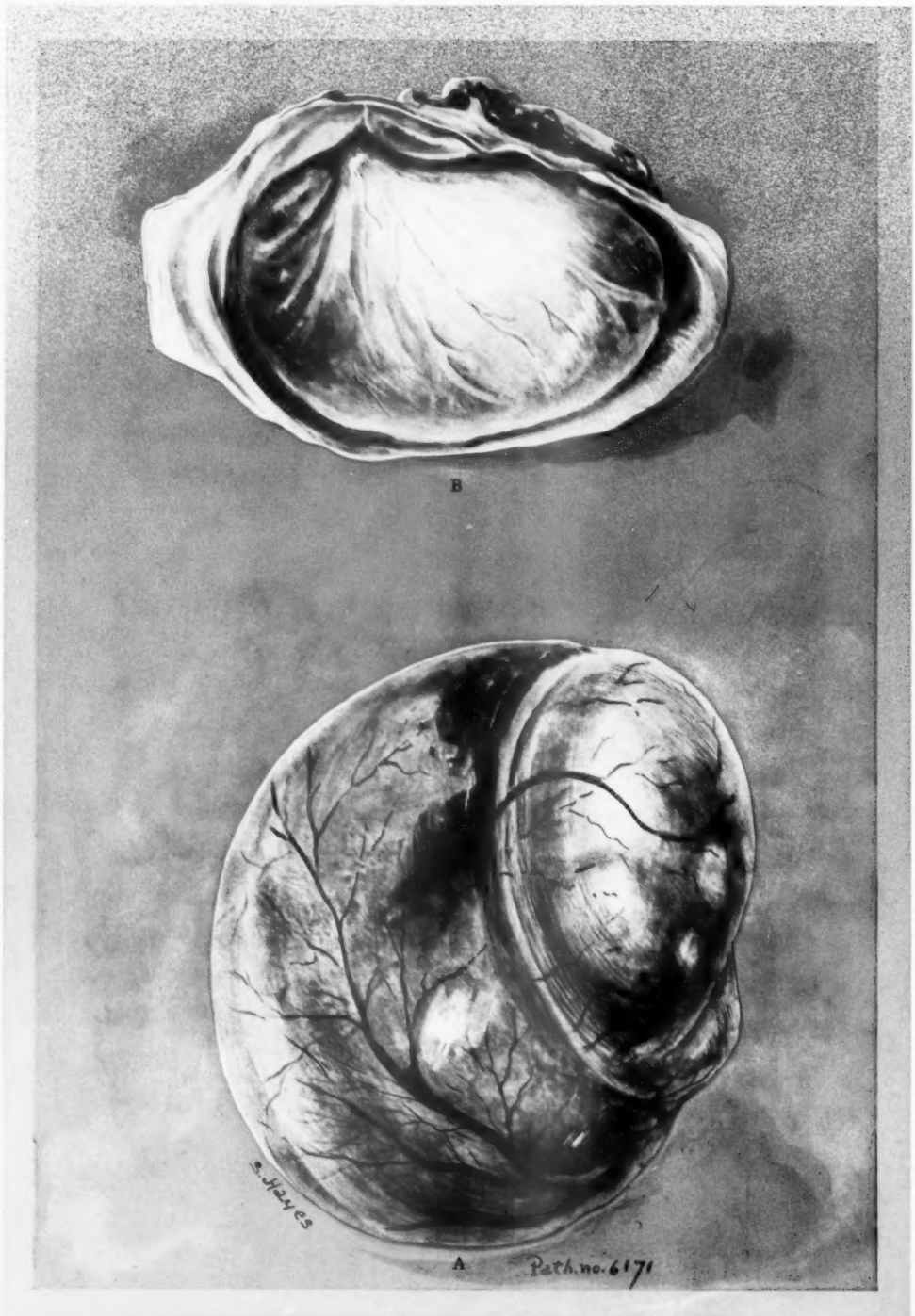

FIGURE 22.—Thyroid cyst of right lobe (case XIV); painting from fresh specimen; A, external surface of unopened cyst; B, inner surface of open cyst.